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PUBLIC REGULATION CONCEPT IN SOLID WASTE MANAGEMENT

National Association of Regulatory Utility Commissioners

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This report provides definition of what a public utility might be in solid waste management, what forms it might take, and whether these new or unique forms might provide more efficient and more economical service to the community than existing systems. The study that Applied Management Sciences has conducted is called a feasibility study, but it is really much more. It is an analysis of several versions of near utilities now in existence in solid waste management and how these verisons have dealt with real day-to-day problems in collecting and disposing of solie waste. It has explored the finanical opportunities available to utility in establishing the capital equipment and operating monies needed for operation. It has examined the legislative framework which now exists at the state, county and municipal levels in this field and the types of legislation needed to permit this concept to work in the future. The study emphasis has been to extend beyond assessing the theoretical conditions and application of feasibility to encompass the practical.

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A Feasibility Study

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1

INTRODUCTION AND OBJECTIVES

Historically, public utilities have been formed in situations where a necessary public service was being performed by a private firm and the nature of the service dictated some limitation on competition or entrance into the field. Usually the factor which dictated limitation on competition was the duplication of capital equipment needed to provide the service (e. g., water or sewerage pipes, gas lines, electrical conduits, etc.). The reason for organizing such services as utilities was that public convenience or necessity dictated the need for the service and the elimination of duplication. Then, as a result, this monopoly or oligopoly situation dictated the necessity for rate regulation. Rate regulation is required because the monopoly situation removes the normal rate balance achieved by the free market system. In the absence of competition, an external force, a regulatory body, is needed to protect the public from rate excesses and to control the profits of firms which operate under considerably reduced risk by virtue of their publically vested monopoly.

It is important to note the nature of a public utility, the forms it may take, and how it operates. Clearly, the monopoly or oligopoly condition which generally dominated the utility form has, in more recent times, been revised. It is a misconception that a public utility has a single form which is clear cut and universally applicable. This is not the case. Rather, centralization is the key issue in any public utility concept and this issue, in and of itself, operates at various levels of control. A minimum criterion for a public utility is that it be regulated by a state or local agency of government. However, at lower levels, wide variances can occur in the actual operation of the public utility. For example, within the framework of the traditional public utilities such as gas, electric, and telephone, a single unit in a totally monopolistic condition exists at the level of operations. In the trucking and transportation industries, which are regulated by many state public utility commissions, a totally open competition condition exists, where there is ease of access to the field as well as egress. The substance of the public utility control here is, in fact, one which is simply over rates and service. Therefore, the operational characteristics of a public utility are not limited to a single unit or a small number of units. A public utility concept can, in fact, operate over a larger number of units of suppliers in the field and for all intents and purposes, practically in an open competition condition. Thus, while public utilities may take on various forms which are suited to the needs of a particular industry, they still adhere to the general definitional precepts of a public utility, which are as follows:

> A public utility is a business organization which performs a necessary and convenient public service. It is specifically not operated by a governmental entity. It operates primarily to serve the public needs but is permitted to make a profit in serving these needs. It is regulated, with respect to quality of operation, by a public agency and with respect to rates, by a public utility commission.

The objectives of this study were as follows:

- To determine whether solid waste management meets the traditional requirements for a public utility situation, and if it does,
- To describe specific forms such a utility might take, and to identify which forms provide the best service for the least cost and offer probable improvements over existing systems.

The concept of centralization in solid waste management is not new. Rather, systems which are highly centralized and thus similar to public utilities have been in operation in various forms in many parts of the country over the past few years. Thus, after closer examination of the field, it was determined that a re-focusing of the original approach to this study was necessary. Rather than examining utilities in other industries to determine applicability to the solid waste management field, the effort was re-formulated to consist of a study of the near utilities which already exist in this area. Thus, the new thrust of this study was to attempt to identify a unified form of a solid waste public utility which would offer significant efficiencies of operation and opportunities for financing which might be needed, but not otherwise available, to a solid waste system.

Historically, solid waste systems have operated throughout the country at one extreme as part of a municipal government or, at the other extreme, as a series of private contractors serving, in completely open competition, both residential and commercial customers. Neither of these variations has proved completely satisfactory in all facets of the operation. In the first case, municipal systems often lose efficiency in their refuse operations due to the practical limitations of bureaucratic and political constraints and, in many cities, because of the lack of complete financial control over refuse operations. The private sector, on the other hand, has the normal profit motive to point it toward operating efficiencies; but in an environment of completely open competition, many of these efficiencies are lost through excessive price competition and the overlap of operating areas. Conversely, in private sector operations with limited or no competition, the opportunity exists for excessive profits in light of no risk or competition.

The objectives of this study are to define what a public utility might be in solid waste management, what forms it might take, and whether these new or unique forms might provide more efficient and more economical service to the community than existing systems. The study that Applied Management Sciences has conducted is called a feasibility study, but it is really much more. It is an analysis of several versions of near utilities now in existence in solid waste management and how these versions have dealt with real day-to-day problems in collecting and disposing of solid waste. It has explored the financial opportunities available to a utility in establishing the capital equipment and operating monies needed for operation.

It has examined the legislative framework which now exists at the state, county, and municipal levels in this field and the types of legislation needed to permit this concept to work in the future.

The study emphasis has been to extend beyond assessing the theoretical conditions and applications of feasibility to encompass the practical.

2

MAJOR ISSUES

There are several major issues which were examined in this study in an effort to find the elements of feasibility and desirability of the concept. These major issues are discussed below.

A. MANAGEMENT AND ORGANIZATION

There are clearly many approaches to the management and organization of solid waste collection and disposal services. For disposal, the management and organization structure is usually centralized under the control of a public works or public health department and, in most instances, the largest portion of disposal remains an operational activity of the public works department. At the other extreme, though rarely found, disposal can be operated and controlled purely by the private sector. In many major cities throughout the country, disposal is operated by the private sector and controlled by public health regulation. In fact, few rate regulations apply to disposal, aside from competition in the private sector and some publicly adjudged equitable price when operated under a public works or public health department.

For management and organization of the collection function, there are a wide variety of methods. Simplifying this concept, it should initially be noted that collection must be considered on the basis of both commercial and residential collection. Commerical collection normally is private enterprise in its purest form. In most cities, it is unregulated by any local public organization and there is, in fact, no limitation upon the number/and or type of private contractors involved in serving commercial Customers. Residential collection is considerably more complex. The residential collection management and organization structure ranges from total public control to a totally private operation, which is usually confined to smaller cities or county areas. Public control is most typically under the operations of the public works department. Once again, in the most common public agency, the public works department attempts to regulate the quality and service of a group of private contractors in essentially open competition for residential business.

Thus, one question to be addressed is what form is best for solid waste in terms of a management concept: a traditional public utility with public utility commission control over a single or many bodies, a traditional public utility that is under public utility control with limited competition, a near-public utility form which provides for limitation on competition without the public utility commission control, simple control under some other public body, or, finally, no control at all over the field.

Moreover, the scope of the operation of a hypothetical utility needs to be carefully defined. For example, is only the municipality to be served or are the suburban areas contiguous to the city also to be included? Is a truly regional concept feasible in this sense and should regional service by a single entity be made part of the utility? Should residential and commercial service be included or only the so-called "public responsibility" for residential service? Should collection and disposal both be a part of the utility concept or should only one or the other of these major functions be included? Clearly, these questions concerning the management and organization revolve around four major management and organization questions, and these are:

- Is centralization of collection into one entity necessary or desirable?
- Is regionalization a practical part of the solid waste utility concept? If so, for both collection and disposal?
- Should residential and commercial collection be included as part of the concept or only residential collection?
- Should collection and disposal functions be combined or separated in the utility form?

B. LEGISLATION

The second set of major issues is concerned with legislative matters. The limitation of competition is an important issue which is both legislative and operational in nature. Completely open competition is the hallmark of our free open market economy; however, it is not in concert with many forms of the utility concept in which relatively minor to severe limitation on competition is necessary for efficient performance of the service. Most forms of the utility concept are dependent on some limitation on competition and in the extreme cases, on a monopoly situation. Eminent domain is another legislative issue which is an important part of this study. In the case of most transfer stations and sanitary landfills, the selection of their location is always a controversial subject since "nobody wants one in his backyard."

A third legislative issue is one that faces the interaction of city and county governments throughout the country and that is how much or how little should each level of government be involved in solid waste management. Finally, among state-level governmental agencies, the question of the extent and nature of the role of each agency in solid waste management is an important one. In a specialized field like solid waste management, the Public Utility Commission would be involved only in rate regulation since it would have no interest or capability in matters of health or environmental protection. The state environmental agency or health agency would be the logical agency to have cognizance over the health or environmental protection associated with the solid waste operation. Clearly, developing a working relationship among state-level agencies is an important legislative issue if there is to be state regulation.

In summary, there are four key legislative questions which must be addressed in the analysis:

- Is limitation on competition desirable?
- Is eminent domain specifically for solid waste necessary at the state level and as a vested power of the utility?

- What role should the municipalities and counties play in the management of solid wastes?
- What is or should be the regulatory function of the public utility commission or public service commission and other state agencies such as the environmental agency?

C. FINANCE

The next class of major issues deals with financial issues. The first of these involves the method for raising revenues to finance solid waste operations. At the municipal level, there are two general methods of accomplishing this end: The first is through tax levies on real estate, sales or income which would be used for all municipal services including solid waste. The alternative to this method is to charge an amount separate from real estate tax levies, which is earmarked for solid waste operations only. This leads to the question of how closely service rates do and should reflect service rendered. That is, should a resident who has a very difficult solid waste collection situation pay proportionately more for service, or should the city at large be responsible, to some extent, for this additional margin of service? The matter of additional incentive charges also is an important part of service rates, that is, charges which are large enough to motivate people to locate their refuse in a place compatible with the system. This arises in unreasonable collection situations such as multi-floor walkups, people housing their refuse in their garage or in some locked compartment, etc. Often an incentive charge for collecting in these extraordinary places is necessary to provide the homeowner with enough motivation to make his refuse more accessible to the collector. For those instances where service rates vary as a function of the level of service provided or as part of an incentive scheme, such rates will be defined as user charges.

The entire question of capital financing of the refuse collection and disposal service is another major financial issue to be addressed. As an adjunct to this issue, the necessary amortization or depreciation period for this capital equipment is another important issue from several standpoints. First, the write off on this type of equipment is a key element of annual operating expenses as well as a part of replacement philosophy. Second, a reasonable assurance of a contract period encompassing the depreciation period is needed in order to ensure the private collector against losing the contract before the vehicles are fully depreciated.

The final financial issue to be considered deals with the assessment of an appropriate profit level for a solid waste management operation. The traditional mode of operation for a public utility organization is to acquire profit based on a rate of return concept. In the field, the rate of return concept is, in fact, the profit rate on either invested capital or on sales. It is one purpose of this study to determine which of these measures, if either, is appropriate within the field of solid waste management. Through a comparative analysis of a number of systems, an attempt is made to scope the overall rate of return consideration. In summary, five financial questions appear to be paramount:

- Should municipal revenues such as real estate tax levies be used to cover operating costs in this industry?
- Should rates be, in fact, user charges which reflect specific service rendered? If so, how should they reflect service rendered?
- What type of financing is necessary, desirable, and available to collection systems for capital equipment replacement?
- What types of depreciation periods are applicable to this industry, and do most contracts or franchises cover adequately this depreciation period?
- What are the requirements for a rate base and the rate of return? Is this return on investment or return on sales; and what is the scope of reasonably expected rates of return under a public utility mechanism?

D. REPLICABILITY OF SYSTEMS

An additional set of issues is concerned with the transferability of systems from one city to another. Some common parameters of replicability are population, demographic, and geographic characteristics of the area. In many cases, these characteristics permit classification of cities and the type of government services offered within them. Another parameter of applicability might be urban and rural characteristics. Particular types of systems may be applicable in an urban or rural environment, but not both. Another parameter of applicability might be the degree of industrialization. Still another might be the prevailing labor market from which this industry can draw people. Also, special characteristics of the city (e.g., prevalence of alley-type collection situations or a prevalence of row houses as opposed to separate, single-family units) would be a determinant of breadth of application. Finally, one problem of paramount importance may be just the pure practicality, in a political sense, of imposing a certain structure on a different city. Briefly, then, five questions of replicability can be cited:

- Are the population and/or other demographic characteristics of the area serviced important?
- Are urban, rural characteristics important to replicability?
- Does industrialization on the local labor market affect replicability?
- Are there special operational characteristics of the city such as alley pickups which affect replicability?
- Do political conditions exist, on a broad enough scale, to allow replication of various utility concepts?

In summary, these management, legislative, financial, and replicability questions were addressed in the study from several different viewpoints, and consolidated into one list of three issues and twelve sub-issues, and the options which are available for each of these twelve sub-issues. A list of these issues and their options is presented in Figure 1. The analysis section should be read in light of these issues and the development of feasible or desirable options within them.

FIGURE 1: MAJOR ISSUES, SUB-ISSUES, AND OPTIONS

ISSUES	SUB-ISSUES	OPTIONS					
MANAGEMENT AND ORGANIZATION	Centralization Level	None	City	County	Region	State	
	Administrative Level	None	City	County	Region	State	
	Collection Ownership and Operation	Private	City	County	Region	State	
	Disposal and Recycling Ownership and Operation	Private	City	County	Region	State	
	Residential/Commercial Coverage	Residential Only	Commercial Only	Residential and Commercial			
LEGISLATION AND LEGAL	Regulatory Level	None	City	County	Region	State	
	Competition	Free and Open	Franchise (Oligopoly)	Monopoly			
	Eminent Domain	None	Public Utility	City	County	Region	State
FINANCE	Rate Regulation	None	City	County	Region	State	
	Capital Financing	Private Debt	Private Equity	General Fund	Operating Revenues	Revenue Bonds	
	Rate of Return	Open market determined	Regulated based on capital investment	Regulated based on revenues			
	User Charges	None	By Class Commercial-Residential	By service rendered within class			

3

ANALYSIS

At the initiation of the study, consultation with the Public Utility Commission had, in fact, yielded a significantly broader definition of the public utility concept than the traditional single unit, monopolistic approach. Based on this input, it was determined that a number of near utility organizations already exist in the field of solid waste management. As a result, it was deemed beneficial to the project objectives to organize our study around those near utility conditions and to explain the requirements for broadening their base or directing their applications more toward the public utility concept. These near-utility concepts will be discussed in this chapter according to the major issues addressed in the previous chapter. A matrix of the case studies and how they relate to the major issues appears in Figure 2.

A. MANAGEMENT AND ORGANIZATION

The management and organization of solid waste systems involve not only the operating systems but the environment in which they function. This includes governmental level of control and administration, regulatory level, ownership of operations, and coverage of service. One important parameter of a solid waste management system which affects the management and organization is the site of the operation in terms of the geopolitical area served. Three of the basic geopolitical units for solid waste management are the municipality, the county, and the region or area. A solid waste management system based on any of these units has certain positive

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Issues	Sub-Issues	Minneapolis	Tacoma	Des Moines	Oregon	New Jersey
MANAGEMENT AND ORGANIZATION	Centralization Level	City	City	Region	County	State
	Administrative Level	City	City	Region	County	None
	Collection Ownership and Operation	City/Private	City	Region	Private	Private
	Disposal and Recycling Ownership and Operation	Private	City	Region	Private/County	Private/County
	Residential/Commercial Coverage	Residential Only	Residential and Commercial	Residential (Collection) Residential and Commercial (Disposal)	Residential and Commercial	Residential and Commercial
LEGISLATION	Regulatory Level	City	City	Region	County	State
	Competition	Franchise	City Monopoly	City Monopoly-Disposal Hybrid-Collection	Franchise	Free and Open
	Eminent Domain	Yes	Yes	No	Yes	Yes
FINANCE	Rate Regulation	Negotiated Contract[1]	City	Negotiated Contract	County	State
	Financing	Private Debt	Operating Revenues	Private Debt/Revenue Bond	Private Debt	Private Debt
	Rate of Return	Not Regulated	Regulated based on Revenues	Non-Profit	Not Regulated	Regulated
	User Charges	Service Rendered	Service Rendered	None (Fixed Charge)	Service Rendered	Service Rendered

[1] Negotiated with MRI, but no regulation as such.

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FIGURE 2: CASE STUDY MATRIX

and negative attributes which are direct functions of the unit being served. The case studies of existing systems discussed on the following pages illustrate each of these. In addition, there are management and organizational approaches such as those which exist in New Jersey which are independent of the minor geopolitical units. These are worthy of investigation and are also discussed on the following pages.

The City of Tacoma, Washington, represents an extreme example of centralization. There is a city operation which is run as a utility, except that rates are not regulated by a PUC or any other body external to the normal municipal channels, and which has control over all aspects of solid waste management in the city. The situation existing around Des Moines, Iowa, is the regional or area approach to solid waste management. Des Moines will be examined to highlight the benefits and problems of a regional solid waste management organization. The approach in Oregon is on a county level with the individual counties having responsibility for solid waste management. The Oregon system features long-term contracts to private haulers under a franchise arrangement. This system will be examined to show how the system is operated and the major factors affecting such a system.

The management organization in Minneapolis, Minnesota, is somewhat unique. The system is centralized in that it only deals with the City of Minneapolis; however, functionally, the responsibility for solid waste collection and disposal is split between the municipal system and the private contractors represented by Minneapolis Refuse, Inc., which is a for profit corporation composed of private contractors in the city. This unique operation will be examined and its salient features highlighted.

1. Minneapolis, Minnesota

The City of Minneapolis has responsibility for the collection and disposal of household refuse generated within the political and geographic boundaries of the city. Operationally, refuse collection is handled by both the Department of Sanitation and the private sector. There are approximately 120,000 residential units to be served in the city. Approximately 60 percent, or 72,000 units, are handled by the private sector while the remaining 40 percent, or 48,000 units, are serviced directly by the city.

The relationship between the city and the private sector is unique. The city does not deal with each individual collector; rather, it deals with Minneapolis Refuse, Inc. (MRI), which is a corporation composed of solid waste firms. The city contracts with MRI specifying that MRI will service a given number of units at a fixed rate per month. This contract is binding upon the members of MRI which assigns routes to the various collectors. The relationship of MRI with the private firms is similar to that of a prime contractor with his subcontractors since the MRI pays the private contractors.

Under the terms of the agreement with MRI, the city pays a fixed rate of $2.55 per month per household. Within MRI, two separate rates are paid to the subcontractors based upon whether the stop is an alley pickup or a "walk-back" pickup. In the case of alley pickups, subcontractors receive $2.24 per month per household; and in the case of "walk-backs", they receive $2.99 per month per household. The $2.55, then, represents an average over all households served. If a person desires more frequent pickup of refuse, he must make a separate agreement with the private sector, even if he is collected by the city. This supplementary service is not covered in the contract between the city and MRI. The city contract covers multiple dwellings such as apartment houses and rooming houses. For each occupied apartment, the city pays $2.55 per month; for rooming houses, four occupied rooms equal one apartment for accounting purposes.

In addition to the delegation of responsibility for the collection of a major portion of the residential wastes, the City of Minneapolis has followed the same approach in the disposal operation. All of the residential disposal is franchised to a single private contractor, Phoenix Industries, who, based upon a standardized rate schedule [1], operates, maintains, and disposes of the residential wastes deposited to transfer stations located in the north side and the south side of the city. The terms of the contract include a five-year period, beginning at its date of execution of May 20, 1971. It is contingent upon a performance bond being supplied by the contractor each year. Price increases are subject to an agreed-upon annual schedule, which was specified as part of the bid requirement and provides a formula increase or decrease rate based on the contractor's experience each year.

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[1] The rate schedule for Phoenix Industries is shown in Appendix A.

The funding for solid waste management comes from the general fund. Although solid waste collection and disposal fees do not appear as a line item on the tax bill, the homeowner is still paying directly for solid waste management services. Prior to instituting the agreement with MRI, an increase in the property tax rate of 5.8 mills was approved.[1/] It was expected that this extra revenue would pay the cost of solid waste collection and disposal services. In a sense, the commercial-industrial sector is, therefore, subsidizing the collection and disposal of household refuse. The 5.8-mills increase in the tax rate applies to all property even though the commercial-industrial sector is not included in the agreement between the city and MRI.

The financing structure for the equipment in the Minneapolis system is shared between the city and the private contractors for collection, and is exclusively in the hands of the private contractor for disposal. One of the motivating factors in the development of this franchising condition was the city's desire to limit their capital expenditures in the field of solid waste management. As a result, trucks, containers and other equipment used in solid waste management are purchased directly by private contractors in the service of their routes. The major benefit to the city under this condition is their ability to minimize the effect on the city's debt ceiling or borrowing authority. As a specific requirement of the contract, the collecting agency, MRI, was required to place a $300,000 bond in the hands of the city. The disposal group was also required to develop a substantial bond.

The agreement between MRI and the city, which appears in Appendix A, is effective for five years. On expiration of the contract, it is the present intention of the parties to renew the contract for a second five-year term. The renewal may not be arbitrarily refused by either of

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[1/] See Appendix A for a complete description of the unusual method of computing assessed value of real estate. Its results in a much lower assessment, and therefore tax revenue than it appears to provide.

the parties so long as the city and MRI have complied with all provisions of the contract. A unique feature of the agreement between the city and MRI is the provision for renegotiation of the price schedule. The agreement calls for a renegotiation of the price schedule on the following dates: January 1, 1972; January 1, 1973; and January 1, 1975. If agreement has not been reached as to a renegotiated price term within thirty (30) days subsequent to any of the above stated dates, the dispute or controversy shall be submitted to arbitration.

The Minneapolis agreement has a number of advantages. First, the city does not have to finance a large solid waste management system. The city can take advantage of the organization and equipment of the private sector. A second advantage of the Minneapolis operation is the length of the contract. The five-year term allows a collector to amortize his equipment, and the city gains the advantage of a long-term contract. The five-year-renewal period provides both the private sector and the city with the knowledge that they will have a long-term agreement if both parties successfully meet their obligations. Another unique feature of the agreement between the city and MRI is the provision for renegotiation of charges which prevents either party from being locked into an unfavorable situation. Still another unique provision allows the city to examine the books of MRI and MRI to examine the books of the municipal operation. The accounting information developed will allow the city to determine if it is more economical to use the existing private sector or to expand the municipal operation. The knowledge that their costs will be compared to the costs of the municipal operation should help to ensure that the charges of the private sector remain reasonable.

Minneapolis represents one of the more advanced relationships between the municipal authority and the locally based private sector in the field of solid waste management. Although it has only been in operation about nine months, the experiment appears to be working well. Collection service is generally good and complaints are minimal. While the private sector has requested, and been granted, a 6-percent rate increase, they still provide service at a rate lower than the city. Further information on Minneapolis is contained in Appendix A.

2. Tacoma, Washington

The City of Tacoma, Washington, is another example of a centralized solid waste management system. In the City of Tacoma, all solid waste collection and disposal, both residential and commercial-industrial, is handled by the city through its Department of Public Works' refuse utility. The Tacoma operation is, in fact, similar to the rather typical public works department approach found in any number of cities. It differs in its requirement to contribute a "profit" to the municipality. A municipal utility does not adhere to the previous definition of a public utility since it is not a private company subject to regulation. However, it fits a class of municipal organizations which merit examination

The solid waste management system in Tacoma is an example of a centralized system in the following respects: By law, only the refuse agency can perform solid waste collection and disposal activities in the City of Tacoma. All private contractors are excluded from this activity. The refuse collection and disposal activities are centralized in the sense that one organization, the refuse agency, has complete responsibility for all solid waste activities in the city.

This centralization is an advantage in designing and implementing a solid waste management system because the single agency can design routes in a consolidated manner to achieve operating efficiency. Such route consolidation is also possible through franchising of private collectors or through the typical municipal operation, demonstrating an attribute which is not limited to a utility concept mechanism.

A second characteristic of the municipal utility concept as practiced in Tacoma is that the revenues and expenses of the operations are treated as a separate revolving fund subject to the necessity to make a profit and the accountability for costs. It is a profit and cost center which permits the management of this service. In 1929, the initial funds were appropriated for its establishment, with the requirement to be a financially self-sustaining entity. The refuse agency charges for its service and is required to return 8 percent of gross revenue to the city as a gross revenue tax.

The Tacoma system employs an elaborate scheme of user charges related to service rendered which is a function of number of cans, distance to the pickup point, and flights of stairs. This scheme permits people to pay for the level of service they receive and to reimburse the utility in a way that is more directly proportional to the cost of providing the service to each individual residence or business.

Another characteristic of the system is that it services both residential and commercial customers and, therefore, is permitted to offset the less profitable residential operation with the more profitable commercial. Instances in which both commercial and residential service is offered by a single agency may be viewed as a subsidy by the commercial customers of the residential operations. It has recently purchased front-loader packer trucks and containers to more efficiently handle commercial service. This equipment difference must be recognized in systems which service both residential and commercial customers.

Finally, a municipal utility is able to obtain land for solid waste operations within its geopolitical boundaries. As an extension of the city government, the refuse utility has the power of eminent domain. In Tacoma, land for disposal has not been a problem; but if it becomes one in the future, it has the tools to deal with it.

Tacoma suffers from no obvious disadvantages in service or costs. However, it must be pointed out that the ten-year equipment depreciation period and the commercial subsidies cloud the financial picture. Supporting the financial confusion is a lack of clarity in the apportionment of certain charges between the refuse agency and other city operating departments.

It is probable that the Tacoma system is an anachronism developed as a result of 1929 standards and political atmosphere, and not likely to be replicable on a broad scale today. A more complete description of Tacoma appears in Appendix B.

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3. Des Moines, Iowa

The Des Moines Metropolitan Area Solid Waste Agency, hereafter called the Agency, is an example of a regional approach to solid waste management. It is an attempt to handle solid waste management on an area-wide basis rather than a county or municipal level. The Agency is a quasi-governmental body with mayors and city councilmen from surrounding communities making up its board of directors. In November, 1969, eleven towns, five cities, and two counties in and around Des Moines, Iowa, created the Des Moines Metropolitan Area Solid Waste Agency (DMMASWA). This intergovernmental Agency was set up as a non-profit corporation with each member community having one representative on the board. Each board member has one vote for each 50,000 in population. The purposes of the Agency are as follows:

a. To provide for the economic disposal, or collection and disposal, of all solid waste produced or generated within each member city, town, and that portion of each member county as the Board of Supervisors shall determine to be part of the metropolitan area, comprising the municipalities.

b. To cooperate with local, state, and federal public health agencies in preventing the contamination and pollution of the land, water and air resources of the area, through the control, collection and disposal of solid waste.

c. To engage such employees and provide offices, equipment, machinery, buildings and grounds as are necessary to adequately perform the functions of the Agency.

d. To contract with member cities, towns and counties, with public or private persons, firms or corporations for the disposal, or collection and disposal, of solid waste, and collect payment for such services, and to receive and expend state, federal and private grants and other monies which may be made available, to the extend permissible under applicable state and federal laws, and under the rules hereinafter set forth.

The Agency is responsible for the collection of residential wastes in those areas that choose to come under its authority. The areas surrounding Des Moines do not have to contract the Agency for the collection of solid wastes. These political entities are free to make any arrangements they wish for the collection of solid wastes. Also, the Agency does not handle commercial or industrial wastes. The commercial-industrial sector has been left to the private contractors.

Each community among the 16 participants in the DMSWA contracts for either collection and disposal or just disposal services. The two-year contract that the City of Des Moines now has with the Agency calls for a charge of $2.00 per month per residential unit. The city can and does invoke its statutory powers to enforce payment of fees, but the Agency (DMMASWA) assumes the risk of delay in payment. If and when rates are to be changed, the board would request renegotiation of rates with the city (or any of the communities using the service), which would then renegotiate the rate with the city.

The regionalization of solid waste collection activities has not worked out as well as planned. Not all of the political entities have chosen to use the Agency for the collection of solid wastes. This is somewhat surprising in that the Agency charges less than the private contractors for equal or better service. While the Agency charges $2.00 per month per household for once-per-week backyard pickup of garbage and rubbish with no limit on the number of containers picked up, private contractors charge from $2.25 to $2.75 for equivalent service. Furthermore, in some cases in private collection, there is a limit of three cans picked up with a charge for extra containers. The Agency is able to offer this lower rate in part because as a non-profit agency no income taxes are paid. Other tax advantages not open to profit making companies are also available to this agency.

The reasons for not using the Agency are not completely rational in the economic sense. Some areas do not use the Agency. They associate the Agency with the previous municipal system in the City of Des Moines which was known for its poor work practices and haphazard operations. Another factor which has retarded use of the Agency for collection is the uncertainty over the fate of a proposed revenue bond issue and doubt over the Agency's ability to purchase a needed landfill site.

After January 1, 1972, all solid waste disposal in the area covered by the 16 jurisdictions came voluntarily under the handling of the Agency. New state-level environmental laws have made "dumps" and open-burning illegal. Those areas that had "dumps" were faced with the prospect of having large financial expenditures in order to improve the quality of their disposal sites. Probably the greatest factor in the use of the Agency for refuse disposal is the unpopularity of disposal sites, even sanitary landfills. A regional disposal system eliminates the need for each political entity to maintain a disposal site. In spite of its regional charter for disposal, the Agency's full powers under eminent domain are uncertain. The location of a new fill site is currently being vigorously resisted with no indication they will be successful in obtaining the site. Perhaps its greatest accomplishment has been convincing the political areas that regionalization is a viable concept in the disposal function.

The financing of collection equipment in Des Moines has been through short-term private debt and lease-purchase agreements. Initially, when the Agency was formed, $206,000 is being paid to the City of Des Moines to purchase their existing equipment. Subsequently, replacement vehicles have been purchased on lease-purchase agreements. Land for a disposal site is being obtained by a $2,000,000 revenue bond at 5 percent interest for 15 years. The proceeds from this bond will cover landfill equipment as well as the land itself in two sites; Metro Park East, which is already in operation, and Metro Park West. The land for these two sites was obtained through conventional means, and eminent domain was not used, even though the Agency has this power by virtue of the composition of its board.

A more complete description of the Des Moines operation appears in Appendix C.

4. Oregon

The Oregon approach to solid waste management differs from the approach in Tacoma and Des Moines. The Tacoma and Des Moines systems represent municipal and regional approaches, respectively, whereas the Oregon system is a county-level approach to solid waste management. Another basic difference between the Oregon approach and those of Minneapolis, Tacoma, and Des Moines is that, in Oregon, solid waste management is handled by private contractors under a franchising arrangement, whereas in Tacoma and Des Moines solid waste functions are handled by the public sector.

In Oregon, under the provisions of H. B. 1051, the counties were delegated the power to franchise out the collection and disposal of solid wastes in unincorporated areas. Incorporated areas have the privilege of using either the county system or providing solid waste management services through some other means. The counties have the authority to form and join regional or area-wide solid waste management systems. Currently, 34 counties are in the process of developing franchise arrangements, and of these, 16 already have franchising in operation. This involves a total of over 50 franchises issued to private contractors.

The county franchising system is usually formed after the Board of Commissioners declares that an emergency exists in solid waste matters. Meetings are held with the private contractors and new routes are formed, customers are traded, and consolidation of routes takes place. Customer-trading is encouraged for a number of reasons. In the first place, it allows the collectors to shorten their routes and decrease unproductive travel time. Secondly, customer-trading allows the private collector to establish an area where he serves the majority of establishments and thus qualify for a franchise area.

With respect to the "Major Issues", the situation in Oregon is one of operational centralization at the county level or at the private firm level as determined by the county. The very nature of this particular franchising mechanism is that the county solid waste board determines the size and number of franchised areas. The collection function is owned and operated entirely by private firms while disposal is conducted by both private firms and county government. Disposal sites are difficult to operate in a sanitary manner in Oregon because of the high rainfall and, therefore, in some counties private firms have not gotten into this function and the county must maintain its own site. Franchises include both residential and commercial coverage, so within the franchised area it is truly a monopoly.

The counties have the power to regulate the rates charged for service. The prevailing rate schedules throughout the state are user charges and are based on the frequency of pickup and the number of cans. A complete rate schedule for the entire state appears in Appendix D. The counties have a mandate to provide satisfactory service at a reasonable rate, not at the lowest possible rate. A reasonable rate is one which is fair to both the customer and the collector. A fair rate for a collector is one which generates enough revenue to meet all business expenses and returns a reasonable rate on investment. Unfortunately, no mechanism exists for determining reasonableness since collectors are not subject to audit or uniform accounting--they are free to keep their books in any lawful manner.

Another unique feature of the Oregon system is the time period of the franchises. Realizing that collectors would be hesitant to invest in equipment that could not be amortized over the life of the contract, the counties decided to award multi-year franchises. Franchises are awarded for a ten-year period, which is a long time when compared to most contracts or franchises. Generally, most solid waste agreements do not extend beyond five years, which is a long enough time to allow the collector to fully depreciate his investment. Internal Revenue permits four- to five-year depreciation for these types of trucks because this is the average useful life of this equipment. The collectors have additional security in that if they provide satisfactory service they will continue to hold the franchise.

Another unique feature in the Oregon system is its lack of formality in determining rates in the face of an otherwise formal regulatory process. There is no uniform accounting system and no official definition of a fair rate of return. The County Board of Commissioners determines whether a rate is fair or not based on the evidence presented in rate hearings, which may differ not only from county to county, but within county.

The private firms holding the franchises all use private sources of financing (mostly debt rather than equity). The existence of the franchise enhances their borrowing power in at least an indirect way since the equipment supplier has evidence of a long-term income stream if the collector continues to provide adequate service to his customers. In one instance out of the approximately 50 franchises already issued, the collector actually assigned the proceeds of his franchise as collateral for an equipment loan.

The Oregon system has a number of advantages. In the first place, the Oregon system uses the existing organization and facilities of the private sector. As a result, the county does not have to finance capital expenditures in a solid waste operation from its general debt fund. Further, in the Oregon system the responsibility for solid waste management is given to the political unit with the power of eminent domain. This can be very important when the county decides it needs additional acreage for a disposal site. A particular advantage of the long time frame of the franchise occurs in the collectors' ability to fully depreciate any equipment used in servicing the franchise area. The collectors are no longer reluctant to buy equipment to service an area. As long as the collector provides satisfactory service at reasonable rates, he will retain the franchise. It should be noted that the above benefit could be obtained with a shorter franchise period. The ten-year franchise period appears to unnecessarily limit competition by its length and is probably not necessary to achieve the same objectives. Conditions throughout the country dictate shorter franchise periods (3 to 5 years).

As with any other structure, there are a number of negative aspects which must be considered. In the first place, the system is limited to unincorporated areas of the county. Incorporated areas, generally the densely populated regions, do not automatically come under the county system. Secondly, even though counties have the authority to join regional associations, this has not happened and it appears unlikely that an individual county would share or surrender its control over solid waste activities. Rate-making is another area in which the possibility of abuse exists. Lack of a uniform system of accounts and hearing each rate case on its own merits make it possible for similar contractors to be earning different rates of return while providing the same level of service. Another disadvantage of the Oregon system is that the ten-year franchise limits competition. A shorter franchise period, such as five years, would still allow the private sector to fully depreciate its equipment while providing the county with the benefits of competition on a more frequent basis.

The existence of certain unique features in Oregon such as the lack of the large urban concentrations and the close working relationship within the private sector may be responsible for the apparent success of the county franchising system. A complete case study of Oregon appears in Appendix C.

5. State of New Jersey

In New Jersey, a state-level approach to the setting up and regulation of solid waste utilities is being implemented. This approach is not concerned with the operation of any one of these utilities but, rather, the broad framework within which they are required to operate.

Prior to the passage of the "Solid Waste Management Act (1970)", there was very little effective control of solid waste activities on either an environmental or an economic basis in New Jersey. Those regulations which existed were either on a county or municipal basis. There was a lack of planning and coordination at local levels and at the state level, there were no effective means for dealing with solid waste on a statewide basis. Solid waste was, for all intents and purposes, an unregulated activity. Consolidation of state policies for solid waste management was one of the primary reasons for passage of the Solid Waste Management Act.

New Jersey contains a mix of solid waste systems. The collection function is split between private contractors and municipal systems. The larger cities usually provide residential solid waste services with commercial services being contracted to private haulers. Smaller municipalities usually contract out all of the collection to private haulers. In the rural areas, the individual usually makes his own arrangements for the removal of solid waste. The operation of disposal sites is again split between governmental units and the private sector. Counties, municipalities, and private individuals own and operate disposal sites.

Under the New Jersey laws, almost all aspects of solid waste collection and disposal have been covered. The law is split into two sections. Title 39, known as the "Solid Waste Management Act (1970)" (shown in Appendix D as Exhibit A), provides for the inspection and registration of all solid waste facilities in the state by the Department of Environmental Protection (DEP). Any landfill operator, incinerator operator, or solid waste collector must have a certificate from the DEP before he can legally operate. The economic aspects of solid waste are regulated by the Public Utilities Commission (PUC). Title 40, known as the "Solid Waste Utility Control Act of 1970" (shown in Appendix D as Exhibit B), places with the Public Utilities Commission (PUC) the responsibility of certification, rate settings, and rate regulation for solid waste collection and disposal service.

The New Jersey situation permits complete decentralization and free and open competition among private contractors. Decentralization is used in the sense that no collector has exclusive rights to any operating area, and any collector may compete for customers anywhere.

3.

Administration of the operation of each utility is the responsibility of its management. However, the PUC does have a set of administrative responsibilities of its own. A great deal of the PUC's administrative activity to date has been in registering landfills and collectors. All landfills that charge a dumping fee are required to register with the PUC and file a tariff of their rates. These rates hold for anybody who has a license to dump solid waste. As long as a person has a valid license to haul solid waste, he can dump at any site where he is willing to pay the rates. Under the laws of New Jersey, the landfill cannot refuse to accept solid waste from a licensed, registered collector of solid waste; nor can the landfill owner charge any rates but those on the filed tariff. The PUC has also spent much time and effort in getting the solid waste collectors to register. At first the collectors were not registering with the PUC as the law required; however, when inspectors refused to let unregistered collectors use landfills, the collectors soon registered.

The DEP has focused its administrative activities on the landfills and disposal facilities in the state. Exhibit C in Appendix D includes regulations pertaining to disposal sites. All disposal facilities must be registered with the DEP. In order to be certified, formal application must be made as shown in Exhibit D in Appendix D. The DEP certificate says that the landfill operator is registered with the state. In order to be registered, an operator must: (1) submit an application to the DEP; and (2) must submit a landfill design that was prepared by a licensed engineer. The landfill design states how the site will be run, its expected volume, and the type of refuse it can accept. The application and landfill design must be submitted each year.

As suggested in the foregoing paragraphs, the PUC and DEP have administrative functions in collection and disposal, but no operational functions or ownership. Operation and ownership are left to private individuals or municipalities, if the municipality chooses to take on this function. A municipality which has its own collection fleet, and serves outside of its municipal jurisdiction, is subject to certification and review by the PUC on the portion of its service outside the municipality, because it is serving "the public" on that service.

One administrative problem has been the lack of precise definition of solid waste collector. Originally, over 2000 contractors applied for certification, of which only 400-500 were solid waste contractors in the usual context. The balance are nurserymen, landscapers, building contractors, and others who frequently use landfills. In order to prevent clogging up the administrative mechanisms with registration of businesses which are not primarily solid waste collectors, the PUC has now exempted certain classes of operation.

The question of residential versus commercial coverage is not explicitly called out in the law so, again, free and open competition is permitted for both types of service.

The law has several financial implications. First, the commission has the right to require tariffs to be filed by both solid waste collectors and landfill operators. The PUC now has the mechanism to determine relative charges around the state and identify and analyze cases of inordinately high rates. Comparative cost factors, financial reporting statements, and the uniform system of accounts have not been designed yet, so any uniform basis for rate determination is still several months off. The legislation calls for three levels of reporting based on gross revenue: Class I is for those having annual gross revenues of $1,000,000 or more; Class II is for firms having annual gross revenues of $250,000 to $1,000,000; and Class III is for firms having less than $250,000 of annual gross revenues. When developed, the reporting requirements will be strictest and the requirement for detail greatest in the largest of these classes. The smaller firms will file relatively simplified forms.

The New Jersey PUC has not become involved in the design of model contracts. Except for requiring a performance bond, the PUC has had very little to do with contracts. The PUC, however, does have the right to examine a contract between a municipality and a private contractor

C.5

and order a reduction in rates if it feels charges are too high. The PUC can take this action on its own initiative without any action being instigated by either the collector or the municipality.

Before any permanent certificates of public convenience and necessity are issued, the PUC will investigate each company. In the interim period, they have been issuing temporary certificates. An important part of the law is a requirement to audit every company applying for a permanent certificate. Because of the large number of solid waste collectors and shortage of auditors in the PUC and lack of a uniform system of accounts, it appears that solid waste collectors will be operating for a long while on the basis of temporary certification, and rates will be determined by the marketplace.

Another requirement for the PUC under the law is to monitor and investigate all stock issuances, mergers, and transfers. This is expecially important in that regulation can possibly be avoided by continuously dissolving and re-forming corporations. Also, certificates are not transferable; therefore, new companies cannot avoid scrutiny simply by buying someone else's certificate.

The law is silent on financing except for the surveillance of mergers and stock issuances. For the most part, private debt and equity financing are used among the private utilities performing collection services.

One advantage of the New Jersey system is that it provides state-level rate regulation for situations where solid waste service spans several geopolitical units such as cities. In municipal-level regulation, they are not able to deal effectively with such inter-city or city-county situations. An additional advantage of this system is that an audit requirement exists. This will ensure not only the validity of the rates of individual contractors but also the comparability of rates among all contractors.

One disadvantage of the New Jersey system is that its provision of free and open competition results in a large number (400-500) of firms which must be regulated in a single state. This will pose an awesome administrative burden on the PUC and its staff just to process rate applications. A second disadvantage in New Jersey is that permitting completely open competition does not allow companies to take advantage of route consolidation and its attendant efficiencies.

Summary

One final note concerns organizational forms which have been established to accomplish day-to-day solid waste operations. These forms include municipal government, private corporation, partnership, and proprietorship approaches and a set of variances of these seemingly distinct systems. In instances where franchises have been issued, intermediate or transitional forms of organization exist, e.g., a partnership which evolves into a corporation, as in the case of the San Francisco firms; a local trade association which evolved into a corporation, as in Minneapolis; a trade association which takes an active role in regulatory activities, as in Oregon.

At the outset of this study, it was assumed that the organizational form of the operating unit was a critical consideration in the evaluation of the utility concept for solid wastes. However, organizational forms in general are of lesser importance in evaluating feasibility than most of the major issues previously discussed. In some instances, the forms are almost indistinguishable from each other. For example, the cooperative form was initially viewed as an appealing transitional form to get private solid waste contractors together for a franchise operation. It was found during the early stages of the study that the cooperative is embodied in solid waste trade associations in practically all of its characteristics. It is, and they are, groups of contractors who have banded together to share information, to make their views known to government, and, in some cases, to share facilities (e.g., parking garages or maintenance facilities), and to take advantage of joint quantity discounts on purchases. However, joint financial responsibility is not assumed by either a cooperative or a trade association, so the cooperative form does not offer any significant advantages over trade associations. Once the group is willing to share financial responsibility, the corporate or partnership form is most appropriate. As a result, the cooperative does not appear to offer unique advantages at any organizational stage.

Thus, in summary, the case studies have illustrated a variety of possibilities for each of the management and organization issues. First, they have indicated that centralization, which is basically a question of geopolitical level, can be accomplished at the city, county, region, or state level. The persuasive arguments for having centralization close to the operating level are tied to efficiency issues which are discussed later in the financial section. Centralization can best be discussed along with the regulatory and administrative issues since they are the mechanisms for achieving centralization.

When centralization is accomplished completely within an incorporated city, such as in Minneapolis and Tacoma, there is no need for involvement by higher-level geopolitical units. Indeed, higher levels have no legal right to be involved in such instances. In both of these cities, the city government acts in the capacity of both a regulatory and administrative body.

When centralization is accomplished at the county or regional level, the state grants the authority to the lower-level regulatory or administrative bodies. In the case of Oregon, the state delegated the regulatory and administrative power explicitly to the county for solid waste management. In the case of Des Moines, the regional solid waste board has this authority by virtue of its corporate charter.

When centralization is accomplished at the state level and is not delegated to a lower level, the state maintains the regulatory authority, and may or may not choose to involve itself in the details of administering the actual operations. In New Jersey, the PUC is involved in rate regulation and the DEP in environmental quality, but neither of these state bodies is involved in administration or operations.

Ownership and operation of the collection and disposal functions are also key management issues. In the case of Minneapolis, ownership and operation of residential collection was split between a large franchise to a private company, MRI, and the public works department. Data are just beginning to be generated over a sufficient time period to permit comparison between the two collection bodies. Disposal is owned and operated by a private firm under a franchise arrangement. In Tacoma, collection and disposal operations are owned by the city (municipal utility. Collection is performed for both residential and commercial customers.

In the presence of county centralization with no large cities and regulation, the city ceases to be an important entity in solid waste management. In Oregon, private firms own and operate the collection function and serve residential and commercial accounts, whereas disposal ownership is split between private firms and county government. In Des Moines, collection is owned and operated by a quasi-public body, the Metropolitan Solid Waste Agency. This body competes with private contractors for commercial collection. Disposal is owned and operated exclusively by this Agency.

In the case of state-level centralization and regulation, New Jersey, the collection and disposal functions are owned and operated by private firms which interact with the two state regulatory bodies (PUC and DEP) for certification and rate regulation.

The legal and financial issues will be discussed and compared in terms of the case studies in the summaries to later sections.

B. LEGISLATION AND LEGAL ISSUES RELATING SOLID WASTE MANAGEMENT TO THE PUBLIC UTILITY CONCEPT

The field of solid waste management has been traditionally considered the domain of the public health authority. As a result, the basic legal definitions and constraints which serve to control the field relate essentially to matters of health. Virtually every state, and most local areas, throughout the nation have a wide variety of rules and regulations concerning the dumping or disposal of garbage and other wastes, the burning or incineration approach to disposing of our waste product, the handling and treatment of dead animals or sewage waste, etc. While these regulations serve to protect the population at large from disease and pestilence that can be wrought from an inadequate disposed of product, relatively little legislation and therefore control, exist in the legal, financial, or operational aspects of solid waste collection.

In terms of collection, the most prevalent form of state or municipal control is in the area of vehicle licensing. This approach to control is developed primarily to afford the local political jurisdiction with simply another source of funding to support their already overburdened taxing system. As a result, until recently, most laws relating to licensing and permits were revenue devices rather than a means of handling the solid waste situation.

The emphasis in this phase of the study is to factor the legislative and legal issues which are involved in solid waste management. Having factored these issues, the study sought to determine the existence of laws at state levels which address solid waste management and utility regulations. Wholly, it is important to determine whether or not a body of legislation exists in this field and the current state of that legislation.

1. Existing State Solid Waste Legislation

Applied Management Sciences conducted a 50 state canvass of state level legislation using both primary and secondary sources of information. The overall results of this canvass are shown in Figure 3

LEGAL ASPECTS COVERED	AL	AK	AZ	AR	CA	CO	CT	DE	DC	FL	GA	HI	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
Contracts for Garb. Coll./Disposal			x		x				x								x	x			x			x								x		x																	
																																				x						x						x		x		
Districts			x		x									x				x		x	x			x						x		x	x	x	x	x				x	x	x						x			
Eminent Domain	x	x	x	x							x						x	x			x		x	x					x	x																					
Licensing						x		x					x			x	x										x					x								x	x				x		x			x	x
Collection																	x		x				x								x								x												
Incineration																					x			x							x																		x		
Wrecking			x									x							x										x																					
Permits						x																				x																									
Incineration		x																			x																														
Disposal System			x																		x								x	x									x												
PUC or other Commission Control			x		x	x						x									x						x				x			x			x			x	x			x				x	x	x	
Franchise Areas Permitted					x	x				x																					x			x	x			x										x			
Dumping-Garbage		x	x		x	x	x	x	x	x	x	x	x	x	x	x	x		x				x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x
Location/Fencing		x	x	x	x																		x																x												

FIGURE 3: SUMMARY OF FIFTY STATE LEGISLATION CANVASS

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LEGAL ASPECTS COVERED (continued)	AL	AK	AZ	AR	CA	CO	CT	DE	DC	FL	GA	HI	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
Litter and/or Obstructions:																																																			
Highways/Streets	x	x	x	x					x	x	x									x	x		x	x	x	x			x	x						x			x							x					
Waterways	x	x	x	x	x				x	x		x									x								x	x						x			x							x					

FIGURE 3: SUMMARY OF FIFTY STATE LEGISLATION CANVASS (Continued)

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OPERATIONAL ASPECTS COVERED	AL	AX	AZ	AR	CA	CO	CT	DE	DC	FL	GA	HI	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
Hog Farm																																																			
Garbage Feeding			x		x		x		x	x	x			x		x	x			x	x		x				x	x		x	x				x	x				x	x			x		x	x			x	x
Burning Carcasses				x																																															
Dumping																																																			
Debris/Garbage	x	x		x	x			x	x	x	x	x	x					x		x	x		x	x	x	x	x	x	x	x	x	x		x	x	x		x	x	x	x			x	x	x	x		x	x	
Nuclear Waste		x																																					x												
Burning/Incineration			x	x	x			x	x					x		x					x					x				x		x	x	x					x	x				x		x			x	x	
Animals - Dead											x						x	x																																	
Disposal	x			x			x	x		x			x		x	x				x	x		x	x	x				x	x					x	x		x			x	x		x	x	x	x	x	x	x	x
Transportation		x								x													x																												
Vehicles						x																																x	x												
Spilling Loads																					x								x									x	x											x	x
Junkyards		x		x			x		x	x	x	x					x	x						x	x					x																x					
Sewage Works		x	x	x	x		x		x	x	x						x	x		x	x		x						x							x										x					
Garbage/Disposal Treatment			x		x		x		x	x		x						x			x	x	x	x	x	x			x	x																x					
Wrecking			x							x																			x																						

FIGURE 3: SUMMARY OF FIFTY STATE LEGISLATION CANVASS (Continued)

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FINANCIAL ASPECTS COVERED	AL	AK	AZ	AR	CA	CO	CT	DE	DC	FL	GA	HI	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
Fees and Taxes		x	x		x	x	x			x		x				x	x	x			x		x	x		x	x	x	x		x		x	x		x		x			x	x					x	x		x	
Audits						x																									x									x								x	x		
(requirement)																																																			
Rate Regulation of charges by gov't.						x										x											x				x			x				x		x								x	x	x	

GURE 3: SUMMARY OF FIFTY STATE LEGISLATION CANVASS (Continued)

GLOSSARY OF LEGAL TERMS AS USED IN SUMMARY OF FIFTY STATE LEGISLATION CANVASS

Legal Aspects Covered	
Contracts for Garbage Collection/Disposal	The state or its counties have the power to contract for the removal or disposal of solid wastes.
Districts	States have the power to create sanitary districts.
Eminent Domain	The states possess the power of eminent domain in regard to solid waste matters.
Licensing	Specific licenses are required for the collection and disposal of solid waste, the operation of dumps and the wrecking of vehicles.
Permits	Permits are necessary for the operation of incineration or other disposal systems.
PUC or Other Commission	Control of solid waste activities is under the Public Utility Commission; the Public Service Commission; or some other Board of Commissioners, such as County Commissioners.
Franchise Areas Permitted	Franchise areas for solid waste activities are permitted by law.
Location/Fencing	Regulations exist that deal with the location of dumps and the necessity of fencing to prohibit wind-blown litter.
Litter and/or Obstructions	Regulations exist governing littering or obstructing highways, streets, waterways and railroads.

Operational Aspects Covered

Hog Farm	Regulations relating to the feeding of raw garbage to hogs and the burning of their carcasses exist. There are also regulations pertaining to hog cholera.
Dumping	Regulations exist governing the dumping of debris and garbage, as well as the disposal of nuclear wastes.
Burning/Incineration	Regulations governing the operational aspects of burning and incineration of solid waste exist.
Animals - Dead	Regulations governing the disposal and transportation of dead animals exist.
Vehicles	Regulation governing the type of vehicles to be used exist.
Spitting Foods	Regulations governing the spitting of solid waste exist.
Junk Yards	Regulations governing the operation of junk yards, such as acceptance of vehicles for junking and concerning the sightliness of the junk yard.
Sewage Works	The operation of sewage works is governed by regulations.
Wrecking	The activity is governed by State Laws.

Financial Aspects Covered

Fees and Taxes	There are specific fees and taxes on solid waste operations.
Audit (Required)	An audit of solid waste companies is required by law.
Rate Regulation of Charges by Government	Some governmental unit within the state can regulate the charges for solid waste services.

NOTE:

These surveys are not complete in the sense that all laws pertaining to solid waste have been examined. For example, a state may have very strict air and water pollution laws. While these are primarily concerned with the quality of air and water, high cleaner standards force the closing of incinerators and waste, purification standards prohibit the location of landfills where there are underground streams. Similarly, rules governing the littering of highways and the use of trucks may be in a Highway Safety Act, although there is great impact on the solid waste industry. Another example is the power of eminent domain. A limited number of states possess this power explicity in solid waste legislation yet all states possess the power of eminent domain.

according to selective legislative categories as covered in each of the 50 states. Following Figure 3 is a definition of each category. While many states have laws concerning various aspects of solid waste management, most legislation is no longer responsive to the present day requirements of the field. Based on our understanding in solid waste management, we have, therefore, disregarded a considerable amount of legislation in this analysis. Rather, our analysis has sought to determine the extent to which legislation existed in states which would be useful in the development of public utility concept in solid waste management. The basic forms of legal authority we have defined as providing input into a public utility structure, include consideration such as:

- PUC or other Commission - control of solid waste activities under the PUC, the public service commission, or some other form of commission, such as a county commission
- Sanitary District - States having the power to create sanitary districts
- Licensing - Legislation which develops specific licenses required for the collection and disposal of solid waste.
- Franchise Areas - State control of franchise areas for solid waste activities, and state designation thereof
- Eminent Domain - The states possess the power of eminent domain in regard to solid waste matters
- Audit Requirements - The audit of solid waste studies is required by law by the state
- Rate Regulation - Some governmental unit within the state can regulate the charges for solid waste services.

A large number of states have one or more of the aforementioned authorities. For example, district designation is controlled at the state level by 17 states. PUC or other commission control exists in 16 states; franchise areas in 8 states, and eminent domain in 12 states. Financial control in the form of audits are within the authorization of four states, and rate regulation of charges by government occurs in ten states. Figure 4 is a table designed to illustrate the key word definition of the state authority and a comprehensive listing of those states having specific public utility related authorities in the field of solid waste management.

States / Authorities	Arizona	California	↓ Colorado	Hawaii	Maryland	Montana	↓ New Jersey	↓ North Carolina	Oklahoma	↓ Oregon	↓ Rhode Island	South Carolina	Texas	↓ Washington	↓ West Virginia	Wisconsin
State or County Regulatory Board Involvement in Solid Wastes	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Audit Requirements			x				x				x			x	x	
Rate Regulation			x				x	x		x	x			x	x	x
Franchise Areas		x	x					x		x						
Licensing or Certification			x		x		x			x						x
Eminent Domain	x				x			x								
Sanitary Districts	x	x			x			x			x			x		

FIGURE 4: STATES WITH REGULATORY AUTHORITY IN SOLID WASTE

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The sixteen states having a state or county level regulatory board are shown in Figure 4 arrayed against the previously discussed seven classes of authority. These seven classes are arranged in descending order of importance on the chart. Among the sixteen states six have the most complete coverage, these six being Colorado, New Jersey, North Carolina, Oregon, Rhode Island, and Washington. In addition, a seventh state, West Virginia is discussed since it has documented precedents of solid waste rate regulation.

Colorado

The Colorado law, augmented by a recent PUC decision, provides for an increasing level of regulation of the solid waste industry. Common carriers of ashes, trash, waste, rubbish, and garbage are required to obtain a Certificate of Public Convenience and Necessity and file a tariff. Rate prescription is now being evaluated pending the development of a uniform system of accounts. An audit requirement is part of the regulatory process now being developed for this industry.

A somewhat unique feature is that carriers are being issued Certificates for particular limited areas of operation. Within each of these areas a set of contractors is permitted to operate. Even though it is not an exclusive franchise, it does represent a limitation on competition within an area. A further requirement is mandatory service within each of these areas. If a person were not receiving service, the PUC could require one of the licensees in that area to provide service.

New Jersey

As stated previously, New Jersey represents landmark legislation in the completeness of coverage of the solid waste problem. In particular, this law provides for a dual responsibility between the PUC and the state EPA, the former for rate regulation and the latter for environmental protection and health. Certification of collectors is required in the law. In fact, this requirement had to be more carefully defined since originally over 2000 firms using disposal sites were certified, only 400-500 of which were bona fide solid waste collectors. Rate regulation will eventually be a requirement, once a uniform system of accounts and the rate regulation mechanism is set up for this industry. An audit requirement is also a part of this law with detail of accounting required divided into three size classes: under $250,000 gross revenues, between $250,000 and $1,000,000, and over $1,000,000. Finally, a key characteristic of the New Jersey law is completely free and open competition with no barrier to entry into the field. The net result of this is a large number of firms to be regulated.

North Carolina

The regulatory level in North Carolina is the Board of County Commissioners which has the authority to issue licenses and prohibit collection by unlicensed operators. The board may also regulate rates although no audit requirement exists. It may also grant the exclusive rights to collect and/or dispose of garbage within a specified (franchised) area. In addition, the board may operate collection and disposal facilities in uncorporated areas, which implies far-reaching operational authority not usually vested in a regulatory board. Finally, it has the clear right of eminent domain for all vacant land in the county.

Oregon

Oregon is similar to North Carolina in that it has vested regulatory powers in county boards set up for this purpose. Moreover, they have given these boards rate regulation power, although they too have stopped short of an audit requirement. These boards also have certification powers and the authority to establish franchise districts by re-allocating existing routes. In this regard, they have proceeded further than North Carolina into formal county operating plans in Clackamas and Marion counties and 50 operating franchises in a total of 16 counties, to date. In total, 34 counties have agreed to follow the same pattern.

Rhode Island

In a new amendment (July, 1971) to the existing state utility law, Rhode Island established PUC authority over solid waste management. Initial certification of all collectors is to be done by a joint commission composed of the Director of Health, Director of Transportation, and Director of Business Regulation. Thereafter, such certificates will be granted by the PUC. This law provides for franchising in the form of recognizing "grandfather" situations. (e.g., a certificate will not be issued in a town in which another public utility is at that time furnishing its service. This is different from the Oregon situation, in that no attempt will be made to re-organize the existing condition, but only to recognize it. The PUC may issue a single certificate in any town it deems necessary. Rate regulation will be conducted by the PUC, however, no audit requirement is explicitly called out.

Washington

The Washington Utilities and Transportation Commission has had legal authority to regulate refuse collectors at least since 1962. They issue certificates of convenience and necessity to qualified collectors and regulate their rates. They have a uniform system of accounts for this purpose. However, they do not have jurisdiction over municipal utilities (such as in Tacoma) or over large franchises within municipalities (such as Seattle). In order to facilitate this regulation, the state has established solid waste districts.

West Virginia

West Virginia vests the authority for regulating solid waste management with County Courts in the legislation, but in practice, the Public Service Commission regulates the rates. The PSC has reviewed financial data of refuse companies and passed judgement on their rate applications. In one case, they began by developing operating ratios and indicated that his proposed operating ratio of 91 percent was within the range for the transportation industry (87%-96%), but finally compromised on rates which presumably would result in a higher operating ratio. This simply indicates a precedent for such rate regulation by a PSC. Eminent domain is vested in the County Courts as is the more sweeping authority to own and operate collection and disposal functions. To date, this latter authority has not been invoked.

2. Competition

Economic theory ascribes many benefits to the role of free and open competition. Some of these benefits are the achievement of supply-demand equilibrium, price stability at equilibrium, and consequently, the supply of a service in adequate quantity at a fair price. Under some conditions, such as the supply of a needed public service, free and open competition may not make sense. The public service may be required by health codes, as in the case of solid waste collection, or as a result of a needed elimination of duplicative investment to cover the same area, as in the case of gas and electric. Since competition is such an important consideration, and has financial and operation ramifications as well as legal, it was examined closely in both the theoretical and solid waste contexts.

First, in the theoretical context, it was useful to examine the classical conditions which dictate the necessity for a monopoly or oligopoly. Our free market system assumes free competition as the best alternative, and the burden of proof lies on establishing a need for a monopoly condition. A monopoly exists when one supplier controls the supply of a commodity or service. Often the public interest requires the establishment of a monopoly in order to best serve the public. Generally, a monopoly requires government regulation so that it may not use its unique status to artificially raise the price by restricting output and creating an artificial scarcity. Economic theory has proven that for a firm operating under perfect competition the greatest profits are obtained when the firm produces the quantity indicated by the intersection of the marginal revenue and marginal cost schedules. A monopoly, however, faces a different situation. It can increase profits more by restricting output and raising the price.

Traditionally, monopolies exist or are created when certain conditions prohibit the free market from working under the conditions of free competition or the public interest is best served by a limitation on competition.[1] One situation in which a monopoly is preferred is where the existence of competition would be detrimental to the public interest. An example is the telephone industry where the existence of many companies would result in a proliferation of telephones, phone lines, and equipment, and in a duplication of service. In order to have adequate service, a party might require numerous telephones so that he could contact a party served by another company. Another situation which tends to favor the existence of a monopoly is the case where firms are not practically free to enter the market because of long lead-time capital requirements. Electric power and gas companies are monopolies because the large capital outlays and the long lead time to construct facilities effectively limit competition. In cases where competition would lead to public inconvenience, a monopoly can also be justified.

Another situation where a monopoly is necessary exists where intense competition among competitors threatens the stability of the industry. The competition among railroad companies toward the end of the nineteenth century is an example of this. When competing railroads had lines going to the same city, the railroads would charge extremely low rates in order to "steal" business from a competitor. Often the rates charged were below the costs of service. This meant, among other things, that the railroads were losing money and therefore attempting to cut costs by not maintaining their equipment adequately. Each railroad hoped to last long enough to bankrupt its competitors. If a company could force its competitors into bankruptcy, it would then be able to charge "what the traffic will bear." It was often cheaper to ship goods long distances on competitive routes than short distances where only one company was providing service.

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[1] See Phillips, Charles F., "The Economics of Regulation"; publisher, Richard D. Irwin, Inc., 1969, p. 19.

4.

In summary, three conditions requiring monopoly are: public convenience and necessity, redundance of capital outlay to provide service, and excessive competition threatening the industry. The characteristics of free and open competition are: free entrance into and exit from the market, no control on quantity, price, or quality of service, and no control over number of competing firms.

In solid waste management, free and open competition now exists in most cities in the commercial business market, and in many cities in the residential market. At this end of the "competition spectrum," contractors literally compete in large numbers for the business, using both price and quantity of service, and many firms enter and leave the marketplace every year (5% nationally enter and 4% leave each year[1/]). Among those who remain in business, fierce competition exists in some areas which may drive prices down below the break-even level and may result in contract default, interrupted service, and high turnover among the smaller companies. In fact, the previous existence of such a condition in Denver led to industry support of franchising areas and the filing of tariffs. Also, in many small metropolitan areas, such as Billings, Montana, competition for the relatively new and growing solid waste market has resulted in drastic price cutting. The situation in New Jersey, even with the new legislation, is one of uncontrolled numbers of contractors, and a very highly competitive situation.

At the opposite end of the "competition spectrum" are municipal monopolies where the city, or a municipal Department of Public Works utility, has complete authority over residential and commercial collection and disposal. The practical problem with such municipal arrangements, in the absence of rate and rate of return regulation, is that there is no positive force to ensure good management practices and efficiencies of operation. Traditionally, regulation has normally awarded utilities for such characteristics. Unregulated municipal operations, in many cases,

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[1/] Applied Management Sciences study of the private sector, performed for NSWMA, in progress at this writing.

perpetuate excessive labor pools (as in Atlanta)[1] due to the existing attitude toward over staffing, or allow inequitable cost allocations (as in Sarasota and Tacoma) among functions within the Sanitation Department

Between these two extremes are cities and counties which employ some form of control on the number of competitors, and therefore create an oligopoly situation. In these instances, franchising is a key part of limiting the number of companies. This is usually done with either city, county, or state level certification, selection of franchisee, and rate regulation. In these franchise situations, competition is permitted in three dimensions: number of franchises, duration of franchises, and type of service covered. In Minneapolis, MRI has a five-year franchise and is made up of 52 smaller companies for residential service. Open competition still exists for commercial service. In Oregon, county-level regulatory boards determine franchises for all service for ten years. There are already over 50 such franchises. In Seattle, which is not analyzed in detail in this report, there are two franchises for residential service for a duration of five years, with municipal-level regulation. In Rhode Island, franchises are being awarded for entire towns for residential and commercial service, under PUC regulation. In many communities and subdivisions around Washington, D.C., one and two year franchises are issued by citizen's groups or other forms of community government. There are literally dozens of variations of the franchise concept, but all have in common the three basic limiting characteristics: oligopoly, periodic renewal and rate review, and specification of class and type of service.

In summary, there is a full range of possibilities for solid waste management with respect to the competition issue, and legal precedent exists for each one of them. Looking back at the classical conditions for monopoly, a case can be made for public convenience and necessity and for reducing redundant capital outlay, although not as strong a case for the latter condition as in more capital-intensive industries. As far as severe competition threatening the solid waste industry, it has not yet reached that point in most cities, although it frequently disrupts otherwise smooth performance of service. A more compelling reason for the limitation of competition lies in the potential efficiencies of such limitation. However, simple limitation on entry does not achieve these efficiencies since route consolidation is the key to these efficiencies. Therefore, a special type of oligopoly, such as the issuance of exclusive franchises, appears to strike the necessary balance between completely free and open competition and monopoly.

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[1] Applied Management Sciences' case studies of eight cities, in progress at this writing.

3. Role of State, County, and Municipal Agencies

Among public bodies, counties and municipalities will have an important role to play in any comprehensive law that deals with solid waste management. Counties and municipalities are the levels of government which are nearest to the actual solid waste operations and which are most familiar with the daily problems that arise in the solid waste management field. The lower-level political units are, hopefully, more in touch with the requirements and problems of the people than the higher units such as states or regional authorities.

Compared with state bodies, counties and municipalities will play their strongest role in solid waste operations. It is they who are familiar and knowledgeable with local geography, housing patterns, traffic patterns, industrial locations, and other unique features of their areas. It is through their county and municipal government that citizens can directly express their favor or disfavor of current policies.

In most cases, the municipality is either the operator or the administrator of the solid waste management system. In addition, it is the collector of real estate and other taxes which are the source of operating revenues for solid waste in the absence of user charges. This means that any state legislation must be compatible with city ordinances in order to be effective. A reference list of city ordinances is shown in Appendix E.

The county is normally the site of the landfill and therefore the recipient of the waste. Moreover, the county has a unique collection problem since it is most often spread out, newly developed, and requires collection with long distances between stops. State laws must also deal with these unique county problems.

Each state possesses the right of eminent domain by virtue of its constitutional rights. Other political units such as counties and incorporated areas such as cities often have this power. In most states, the right of eminent domain is not held by the unit responsible for planning and maintaining solid waste management activities. New Jersey is a prime example. For example, in New Jersey the State Department of Environmental Protection (DEP) must issue licenses to all sanitary landfills and disposal sites. However, it cannot condemn land, except for demonstration purposes. The power of eminent domain lies with the counties whose legislation concerning solid waste management has been superseded by the state. Counties in New Jersey now possess very little real power in solid waste management; however, the counties still possess the right of eminent domain.

Currently, only a limited number of states make use of the power of eminent domain at the state level for solid waste management purposes. This probably stems from the fact that most states do not have comprehensive laws governing solid waste management. Presently, we find the power of eminent domain located at the county level or with incorporated areas and cities. In many areas, this power is used only with extreme caution since the location of any type of solid waste facility such as a garage, transfer station, or landfill is nearly always opposed by affected area residents.

> "Finally, the specific right of eminent domain has been given to most regulated industries. (The exceptions are the airlines, motor carrier, and water carrier industries, and coal slurry pipeline companies.) This right enables them to condemn private property and take it for "public use" when necessary to the proper conduct of their business. The regulated industries are required to pay a just compensation for any property so condemned. Land may be taken, for instance, for electric or telephone pole lines or for water mains, to enable a regulated company to provide adequate service for the public."[1]

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[1] Phillips, Charles F., Jr., "The Economics of Regulation", published by Richard D. Irwin, Inc., 1969.

Therefore, there is precedent for utilities having this right, in addition to government's possession of the right.

Summary

In summary, there are many legal aspects of solid waste management for which precedents exist. Some of the more common of these are State or County Regulatory Board involvement in solid waste, certification of solid waste contractors, rate and rate of return regulation, and the establishment of sanitary districts. However, it is the unique approaches which bear discussion in summarizing this section of the report.

In New Jersey, for example, the Public Utility Commission has the right to set a ceiling on rates in order to prevent excesses in rate charges in this industry. Conversely, in Colorado, a recent order of the Regulatory Commission indicates interest in rate prescription which may be accompanied by a rate floor in order to avoid the opposite problem of price cutting and excessive price competition. Oregon has delegated the rate regulating authority for solid waste management to the County Boards, while West Virginia has attempted to develop operating ratios for rate setting similar to those used in the motor transport industry. It is clear from this information that wide boundaries are defined in the precedents for approaches to rate regulation.

Similarly, a wide variety of precedents exist for franchising. They range from county-level franchising of solid waste areas to private contractors, which is done in Oregon, to a less specific franchising authority given by the Rhode Island PUC to towns and villages. In this latter case, the PUC has the right to issue a franchise for exclusive service in any town or village to a private contractor. This is something that they have not exercised to a great extent, as of this writing, but nonetheless is a legal precedent.

In Colorado, still another franchise approach exists which certifies collectors in a solid waste area but not with exclusive right to collect in that area. That is, more than one collector is granted the right to collect solid waste so that it is really a form of controlled competition within an area.

Still another area in which a broad spectrum of precedents exist is that of audit requirements. In the State of West Virginia, private contractors are subject to audit whenever they submit an application for rate increase to the Public Utilities Commission. This permits the PUC to analyze not only their rates but also the rate of return and to make a judgment regarding how equitable both are. In West Virginia, this is an ongoing process so that not only does it provide legal precedent but also a history of implementation. The same can be said for the State of Washington in which a requirement for audit in this field has been in existence for quite some time. In the States of Colorado, New Jersey, and Rhode Island, the audit requirement is part of the legislation and accompanying PUC decisions. However, either from a lack of uniform system of accounting or from other practical problems, implementation has not been completed as yet in these states. Finally, in Oregon, rate regulation proceeds without any audit requirement but rather a simple judgmental test of reasonableness is applied on the part of the County Solid Waste Regulatory Board.

It is clear from the analyses performed in this section that a wide scope of precedents exist in all of the important aspects of solid waste regulation. Thus, any state or county which was formulating new legislation or executive directives in this area could call upon a wide variety of legal precedents elsewhere in order to be on firm legal ground. This serves to further illustrate the breadth of the public utility concept in terms of the number of forms that it may take and the ways in which it may be applied.

C. FINANCE

This section encompasses the financial considerations involved in solid waste management and the regulation thereof. Three basic topics are methods of generating operating funds, including user charges; rate determination and rate regulation; and capital financing. Within the first of these are various philosophies of raising operating funds through direct and indirect means. The second topic describes the issues involved in determining rates and profits on a comparable basis, determining a fair rate of return, and regulating rates. The final topic addresses methods of capital financing available and those most commonly used in this industry.

1. Methods of Generating Operating Funds

It is important, at the outset, to define terms carefully because of the potential confusion. For the purposes of this research, there are three basic methods of generating operating funds:

- Tax Levies - revenues raised from real estate or other taxes and budgeted for solid waste management. These may or may not show up as a separate line item on the tax bill.
- Fixed Charges - revenues generated from a fixed charge which, in a municipally controlled operation, is separate from taxes, but which does not reflect level or type of service. An example of a fixed charge for a municipal system would be a flat rate charged for residential service which appears on everyone's water bill. Similarly, many private contractors charge a fixed rate for collection service.
- User Charge - a variable charge which varies according to the level of service rendered.

Individuals contracting directly with private contractors pay a direct service charge for the removal of solid wastes which may be either a fixed charge or a user charge. Municipalities or other governmental authorities providing solid waste management services can fund their operations in any of the three basic ways. Funds raised from tax levies can be assigned to this operation directly from the general fund or municipal treasury, fixed charges may be imposed, or user charges may be imposed upon the user of services according to his consumption of the services. Within the general definition of user charges are many classes of charges for various types of service which will be discussed later in this section.

One advantage of both fixed charges and user charges over tax levies which do not specially call out solid waste charges is that they generate separate "solid waste" revenues. Then, the solid waste organization does not have to compete with other municipal operations within the city for appropriations from the general tax fund. In cities which use tax levies to finance solid waste operations, the solid waste management budget is subject to the normal budgetary process and might be cut--without regard to the actual operating costs of that function.

Another advantage of both fixed charges and user charges is that they force the solid waste operation to be run as a business and increases the visibility of operating efficiencies. When operating funds are appropriated from the general fund, there is no "income" as such, and it is extremely difficult to determine the operating efficiency of the solid waste system. When the solid waste operation receives income from an identifiable source such as fixed or user charges and is forced to meet expenditures from such income, any profits or deficits can be determined and measures of efficiency can be developed. Services provided for other agencies are explicitly stated. For example, if the refuse maintenance facility is used by other agencies, charges for this service become income (or diminished expenses) of the refuse agency.

Another advantage of fixed and user charges over tax levies is that they make it easier to develop a case for a rate increase when needed by providing "profit and loss" visibility into financial management. The solid waste operation can visibly demonstrate the need for a rate increase if the revenue and costs have been compiled. The city manager or city council would then have to decide whether to increase user charges or subsidize the operations with monies from the general fund. Recognizing that most cities are strapped for funds, it would be expected that rate increases would be preferred to a subsidy from the general fund that is already inadequate to meet all demands put upon it, unless political expediency dictated otherwise.

A case for user charges can also be made on the basis of "equity" or fairness. When solid waste operations are financed from the general fund, this means that all taxpayers are paying for solid waste management services even though they may not be receiving services. For example, in Minneapolis, commercial customers were subject to a tax increase for solid waste management, but they do not benefit at all, from the city services. User charges force the beneficiaries of service to pay directly for that service.

One final benefit of fixed charges or user charges for municipal systems is the ability to float revenue bonds that their use permits. Basically, revenue bonds are bonds whose interest and principal are ultimately paid back from the revenues of the authority issuing the bonds, not the general fund of the municipality. Moreover, the revenues of the operation are pledged as collateral for the issue. In effect, holders of revenue bonds are creditors of the issuing authority. Revenue bonds possess two large advantages as compared to general obligation bonds. In the first place, revenue bonds generally carry a lower rate of interest than general obligation bonds. The second advantage of revenue bonds is that they do not count towards the fulfillment of municipalities' legal debt limit. Also, revenue bonds do not need the approval of the electorate to be issued. In this era of fiscal conservatism, taxpayers have been refusing general obligation bond issues for such items as schools and roads. Bond issues for solid waste management might meet the same fate.

A practical shortcoming of revenue bonds is that they are only acceptable for a period equal to or less than the life of the equipment being financed by them. Trucks with a life expectancy of five years cannot be financed with 15- to 30-year bonds. More discussion of this subject appears under the "capital financing" section.

The question of user charges is one which may be viewed in classical utility parlance in terms of "rate classes." For example, in solid waste, there are two major rate classes: Residential and Commercial. Within each of these are sub-classes. For example, within residential, there are sub-classes related to frequency of pickup and point of pickup. Within commercial, there are sub-classes related to frequency of pickup and size of container. An example of one of the most elaborate schedules of rates for residential collection is shown in the table below.

Residential Class Rates (Example from Tacoma)

Distance for Pickup	Once/Week Service Cost/Month	Flights of Stairs
Basic Charge 0-25 ft.	$1.75 - 1st can 0.85 - ea. extra	$1.00/flight
26-75 ft.	$2.65 - 1st can 1.80 - ea. extra	$1.00/flight
76-120 ft.	$3.55 - 1st can 2.70 - ea. extra	$1.00/flight
121-200 ft.	$4.50 - 1st can 3.65 - ea. extra	$1.00/flight

A similar schedule of monthly charges for commercial collection is shown in the next table.

Commercial Class Rates (Example from Atlanta)
Cost/Month

Container Size (cu. yd.)	Frequency of Pickup					
	1	2	3	4	5	6
4	$20.80	$41.60	$ 62.40	$ 83.20	$104.00	$124.80
5	26.00	52.00	78.00	104.00	130.00	156.00
6	29.83	59.80	89.70	121.10	149.50	179.40
8	38.13	76.27	114.40	152.53	190.67	228.80

2. Rate Determination and Rate Regulation

Rate determination is developed in much the same way as prices are determined in a well-run business. All cost elements are developed and analyzed. The major cost elements are direct labor, indirect labor, supplies and equipment (including depreciation), and general and administrative (or overhead). A complete and detailed breakdown for this industry is shown in section a below. These costs are then divided by units of service provided (e.g., residential stops) in a specified time period (e.g., one month) to determine the investment, operating, and maintenance costs per unit (e.g., cost per stop per month).

Once unit costs have been determined, the next component of rates is rate of return, and an entire section of the report is devoted to the development of a fair rate of return. Rates for any class of service then are "burdened" unit costs for that service (including overhead) plus the profit margin, or rate of return. One final consideration where there is an element of competition is the price level the market will bear, since rates above current market level make no sense, regardless of how carefully they were derived.

Currently, rates are determined in the private sector according to their costs, their expected rate of return, and what the market (and competition) will bear. Rate regulation in these instances is left to the marketplace. In some instances, this works out well and in others there are excesses in both extremes. Where rates are too high, true competition does not exist and customers are being excessively charged. At the other extreme, rates that are too low allow "buy-ins" by incompetent firms with contract default and interruption in service. Rate determination should follow the same steps as any regulated firm pursues in preparing an application for an increase in rates.

a. Development of Uniform System of Accounts

It is extremely difficult, if not impossible, to compare financial statements among firms unless they use similar or identical accounting practices. Such a uniform system of accounts for solid waste management has been developed as part of this study using knowledge of the accounting practices in this industry, the peculiarities of the industry, and upon the approaches taken in several states which have attempted to set up such systems for rate regulation or other purposes. The uniform system which has been developed appears as Figure 5 over the next 15 pages.

The uniform system appears in four parts: Consolidated Profit and Loss Statement, Profit and Loss Statement, Distribution of Operating Expense, and Comparative Balance Sheet. The first three are presented in increasing order of detail. The first table shows consolidated figures for a general overview of the operation. The second of these tables, labeled "PROFIT AND LOSS STATEMENT," shows operating revenues broken down into residential service, various types of commercial service, special service, and disposal. This permits a fine enough breakdown to separate commercial revenues from residential since they represent separate classes of revenue for regulator purposes.

Operating expenses are broken down the same way to permit the determination of prices based on separate commercial and residential costs. Also, if regulation were to be on rate-of-return for specific class of service, this breakdown would permit "pairing" of commercial revenues with commercial expenses (plus a proportionate amount of overhead) to determine "commercial profit." The same could be done to determine "residential profit."

One problem in classification, which was overcome in part, dealt with the confusion which exists when a single vehicle collects both commercial and residential refuse and cannot be neatly classified into one or the other category. This occurs both on primarily residential routes and on primarily commercial routes, where routing convenience dictates that a single truck pick up both types of customer. This was overcome, in part, by breaking out containerized commercial expenses from other commercial service. The containerized commercial expense is clearly commercial[1], so the category of possible confusion has been

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[1] Commercial includes apartments over four-plex, retail stores, manufacturing plants, etc.

FIGURE 5

CONSOLIDATED PROFIT AND LOSS STATEMENT

OPERATING REVENUES		
Residential Service	$......	
Comm. Service - Containers	......	
Comm. Service - Other	......	
Municipal and Public Service	......	
Special Service	......	
Waste Material Sales	......	
Disposal Charges	......	
Total Operating Revenue		$......
OPERATING EXPENSES		
Collection	$......	
Disposal	......	
Total Operating Expense		$......
Operating Income		$......
General Office	$......	
Net Operating Income		$......
MISCELLANEOUS REVENUE		
Interest Revenue	$......	
Other Miscellaneous Revenue	......	
Total Miscellaneous Revenue		$......
MISCELLANEOUS EXPENSE		
Interest Expense	$	
Other Miscellaneous Expense	......	
Total Miscellaneous Expense		$......
Net Income Before Income Taxes		$......
Provision For Income Taxes		......
Net Income (or Loss)		$......

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FIGURE 5 (Continued)

Miscellaneous Expense		
Interest Expense	$......	
Other Miscellaneous Expense	......	
Total Miscellaneous Expense		$......
NET INCOME BEFORE INCOME TAXES		$......
Provision for Income Taxes		......
NET INCOME (LOSS)		$......

FIGURE 5 (Continued)

DETAILED PROFIT AND LOSS STATEMENT

OPERATING REVENUES		
Residential Service	$......	
Comm. Service - Containers	......	
Comm. Service - Other	......	
Municipal and Public Service	......	
Special Service	......	
Waste Material Sales	......	
Disposal Charges	......	
Total Operating Revenues		$......
OPERATING EXPENSES		
Residential Service		
Collection	$......	
Disposal	......	
Total Residential Service Exp.		$......
Comm. Service - Containers		
Collection	$......	
Disposal	......	
Total Comm. Service - Containers		$......
Comm. Service - Other		
Collection	$......	
Disposal	......	
Total Comm. Service - Other		$......
Municipal and Public Service		
Collection	$......	
Disposal	......	
Total Municipal and Pub. Serv.		$......
Special Services		
Collection	$......	
Disposal	......	
Total Special Services		$......
Operating Expenses		......
General Office Expenses		$......
NET OPERATING INCOME		$......
Miscellaneous Revenue		
Interest Revenue	$......	
Other Miscellaneous Revenue	......	
Total Miscellaneous Revenue		$......

FIGURE 5 (Continued)

Definition of accounts in Profit and Loss Statement:

OPERATING REVENUES

RESIDENTIAL SERVICE

Credit to this account all revenues derived from the collection of refuse from private dwellings, occupied and used as homes or residences of individuals or families for regular collection service.

COMMERCIAL SERVICE--CONTAINERS

Credit to this account all revenues derived from the containerized collection of garbage and refuse from apartment houses, hotels, clubs, places of worship, restaurants, boarding houses, eating places, shops and places of business for regular collection service.

COMMERCIAL SERVICE--OTHER

Credit to this account all revenues derived from the non-containerized collection of garbage and refuse from apartment houses, hotels, clubs, places of worship, restaurants, boarding houses, eating places, shops and places of business for regular collection service.

MUNICIPAL AND PUBLIC SERVICE

Credit to this account all revenues derived from the collection of refuse from all municipal buildings and property.

Credit to this account all revenues derived from the collection of refuse from all civil divisions of government such as municipal, federal, state, county government installations; school, power, park and port districts, etc.

SPECIAL SERVICES

Credit to this account all revenues derived from the removal and disposal of dead animals, cleaning of vaults, tanks and cesspools, the removal of brush, grass, weeds, rubbish and miscellaneous debris.

Credit to this account all revenues derived from the collection of all refuse from regular services both commercial and residential, which exceeds in quantity the amount of refuse covered by the regular monthly rate therefor.

FIGURE 5 (Continued)

WASTE MATERIAL SALES

Credit to this account all revenues received from the sale of waste materials such as paper, glass, and metals.

DISPOSAL CHARGES

Credit to this account all revenues received from the use of disposal facilities by other persons, firms, and governmental units.

PENALTY CHARGES

Credit to this account all assessments of penalties for delinquency in payment of accounts.

OPERATING EXPENSE

COLLECTION

Charge to this account all expenses incurred in the collection of solid wastes such as salary and wages, fuel, insurance, depreciation, printing, maps, and all other expenses incidental thereto.

DISPOSAL

Charge to this account all expenses incurred in the disposal of solid wastes such as salary and wages, fuel, insurance, depreciation, printing, and all other expenses incidental thereto.

GENERAL OFFICE

Charge to this account all general office expenses that cannot be allocated to either collection or disposal.

INTEREST REVENUE

This account shall include all interest revenues accrued or received on investments, loans, bank deposits, or other sources.

INTEREST EXPENSE

Charge to this account each month the monthly proportion of interest accrued on outstanding bonds.

OTHER MISCELLANEOUS REVENUE

Credit to this account all miscellaneous and non-operating revenues not provided for elsewhere, such as work performed for others or compensation for materials and supplies furnished to others.

FIGURE 5 (Continued)

OTHER MISCELLANEOUS EXPENSES

Charge to this account all miscellaneous and non-operating expenses not provided for elsewhere, such as the cost of work performed for others, or materials and supplies furnished for others.

FIGURE 5 (Continued)

DISTRIBUTION OF OPERATING EXPENSE

For the Year Ended ________

	Current Year	Previous Year	Increase or (Decrease) Dollars	Increase or (Decrease) Percent
REFUSE COLLECTION				
Residential Service Expense				
Wages and Salary Expense				
Supervisors	$......	$......		
Drivers	......	......		
Helpers	......	......		
Total Wage and Salary Expense	$......	$......		
Vehicle Operations Expense				
Gas and Oil	$......	$......		
Tires and Batteries	......	......		
Equipment	......	......		
Depreciation	......	......		
Total Equipment Operations Expense	$......	$......		
Vehicle Maintenance Expense				
Parts	$......	$......		
Direct Labor	......	......		
Supervisory Labor	......	......		
Total Equipment Maintenance Expense	$......	$......		
Other Equipment Expense				
Equipment - Rental/Depreciation	$......	$......		
Containers - Rental/Depreciation	......	......		
Garage	......	......		
Insurance	......	......		
Other	......	......		
Total Other Equipment Expense	$......	$......		
Total Residential Service Expense	$......	$......		

FIGURE 5 (Continued)

	Current Year	Previous Year	Increase or (Decrease) Dollars	Increase or (Decrease) Percent
Commercial Service--Containers				
Wages and Salary Expense				
Supervisors	$......	$......		
Drivers	......	......		
Helpers	......	......		
Total Wages and Salary Expense	$......	$......		
Vehicle Operations Expense				
Gas and Oil	$......	$......		
Tires and Batteries	......	......		
Equipment	......	......		
Depreciation	......	......		
Total Equipment Operations Expense	$......	$......		
Vehicle Maintenance Expense				
Parts	$......	$......		
Direct Labor	......	......		
Supervisory Labor	......	......		
Total Equipment Maintenance Expense	$......	$......		
Other Equipment Expense				
Equipment - Rental/Depreciation	$......	$......		
Containers - Rental/Depreciation	......	......		
Garage	......	......		
Insurance	......	......		
Other	......	......		
Total Other Equipment Expense	$......	$......		
Total Commercial Service Exp. Cont.	$......	$......		
Commercial Service Expense - Non Containerized				
Wages and Salary Expense				
Supervisors	$......	$......		
Drivers	......	......		
Helpers	......	......		
Total Wages and Salary Expense	$......	$......		

FIGURE 5 (Continued)

	Current Year	Previous Year	Increase or (Decrease) Dollars	Percent
Vehicle Operations Expense				
Gas and Oil	$......	$......		
Tires and Batteries	......	......		
Equipment	......	......		
Depreciation	......	......		
Total Equipment Operations Expense	$......	$......		
Vehicle Maintenance Expense				
Parts	$......	$......		
Direct Labor	......	......		
Supervisory Labor	......	......		
Total Equipment Maintenance Expense	$......	$......		
Other Equipment Expense				
Equipment - Rental/Depreciation	$......	$......		
Containers - Rental/Depreciation	......	......		
Garage	......	......		
Insurance	......	......		
Other	......	......		
Total Commercial Service Exp.-Other	$......	$......		
Municipal and Public Service Expense				
Wages and Salary Expense	$......	$......		
Supervisors	......	......		
Drivers	......	......		
Helpers	......	......		
Total Wages and Salary Expense	$......	$......		
Vehicle Operations Expense				
Gas and Oil	$......	$......		
Tires and Batteries	......	......		
Equipment	......	......		
Depreciation	......	......		
Total Equipment Operations Expense	$......	$......		

FIGURE 5 (Continued)

	Current Year	Previous Year	Increase or (Decrease) Dollars	Increase or (Decrease) Percent
Vehicle Maintenance Expense				
Parts	$......	$......		
Direct Labor	......	......		
Supervisory Labor	......	......		
Total Equipment Maintenance Expense	$......	$......		
Other Equipment Expense				
Equipment - Rental/Depreciation	$......	$......		
Containers - Rental/Depreciation	......	......		
Garage	......	......		
Insurance	......	......		
Other	......	......		
Total Other Equipment Expense	$......	$......		
Total Municipal & Public Service Expense	$......	$......		
"Services with Special Rates" Expense				
Wage and Salary Expense				
Supervisors	$......	$......		
Drivers	......	......		
Helpers	......	......		
Total Wage and Salary Expense	$......	$......		
Vehicle Operations Expense				
Gas and Oil	$......	$......		
Tires and Batteries	......	......		
Equipment	......	......		
Depreciation	......	......		
Total Equipment Operations Expense	$......	$......		
Vehicle Maintenance Expense				
Parts	$......	$......		
Direct Labor	......	......		
Supervisory Labor	......	......		
Total Equipment Maintenance Expense	$......	$......		

FIGURE 5 (Continued)

	Current Year	Previous Year	Increase or (Decrease) Dollars	Percent
Other Equipment Expense				
Equipment - Rental/Depreciation	$......	$......		
Containers - Rental/Depreciation	......	......		
Garage	......	......		
Insurance	......	......		
Other	......	......		
Total Other Equipment Expense	$......	$......		
"Total Service with Special Rate" Exp.	$......	$......		
Total Collection Expenses	$......	$......		
REFUSE DISPOSAL EXPENSE				
Landfill				
Wage and Salary Expense				
Supervisors	$......	$......		
Drivers	......	......		
Helpers	......	......		
Total Wage and Salary Expense	$......	$......		
Vehicle Operations				
Gas and Oil	$......	$......		
Tires and Batteries	......	......		
Depreciation or Rental	......	......		
Insurance	......	......		
Total Equipment Operations Expense	$......	$......		
Vehicle Maintenance Expense	$......	$......		
Parts	......	......		
Direct Labor	......	......		
Supervisory Labor	......	......		
Garage	......	......		
Total Equipment Maintenance Expense	$......	$......		
Disposal Cover and Fill Material	$......	$......		
Licenses, Fees, and Taxes	......	......		
Rent	......	......		
Total Landfill Expense	$......	$......		
Dumping Fees Received	$......	$......		
Net Total Landfill Expense	$......	$......		

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FIGURE 5 (Continued)

	Current Year	Previous Year	Increase or (Decrease) Dollars	Percent
Incinerator				
Operating Expense				
Wage and Salary Exp.				
Supervisors	$......	$......		
Skilled Workers	......	......		
Other Salary and Wages	......	......		
Total Wage and Salary Expense	$......	$......		
Fuel	$......	$......		
Depreciation or Rental/Fee	......	......		
Equipment Maintenance Exp.				
Parts	......	......		
Direct Labor	......	......		
Supervisory Labor	......	......		
Total Equipment Maintenance Expense	$......	$......		
Insurance	$......	$......		
Licenses, Fees, Taxes	......	......		
Other Incinerator Expense	......	......		
Total Incinerator Exp.	$......	$......		
Incinerator Fees Received	$......	$......		
Net Total Incinerator Expense	$......	$......		
Net Total Disposal Expense	$......	$......		
All. to Res. Serv.	$......	$......		
All. to Comm. Ser. -Containers	......	......		
All. to Comm. Ser. - Other	......	......		
All. to Mun. & Public Service	......	......		
All. to Ser. with Special Rate	......	......		
Net Total Disposal Expense	$......	$......		

FIGURE 5 (Continued)

	Current Year	Previous Year	Increase or (Decrease)	
			Dollars	Percent
GENERAL OFFICE EXPENSE				
Supervisor's Salary	$......	$......		
Other Salary and Wages	......	......		
Vehicle Expense	......	......		
Injuries and Damages	......	......		
Industrial Insurance	......	......		
Health and Welfare	......	......		
Retirement Contributions	......	......		
F.I.C.A. Costs	......	......		
Employees Liability and Surety Bonds	......	......		
Equipment Insurance	......	......		
Insurance - General Liability	......	......		
Legal Fees	......	......		
Accounting Fees	......	......		
Depreciation of Office Equip.	......	......		
Miscellaneous General Exp.	......	......		
Total General Office Ex.	$......	$......		
Total Operating Exp.	$......	$......		

NOTE: Only those expenses which cannot be allocated between collection and disposal should appear under General Office Expense.

FIGURE 5 (Continued)

COMPARATIVE BALANCE SHEET

As At ____________________

	Current Year	Previous Year	Increase or (Decrease) Dollars	Increase or (Decrease) Percent
	ASSETS			
FIXED ASSETS				
Organization	$......	$......		
Land	......	......		
Buildings, Fixtures, Grounds	......	......		
Equipment	......	......		
Less Accumulated Depreciation and Amortization	......	......		
Total Fixed Assets	$......	$......		
CURRENT ASSETS				
Material and Supplies	$......	$......		
Operating Fund Cash	......	......		
Special Deposits Cash	......	......		
Special Deposits Investments	......	......		
Cash-On-Hand	......	......		
Other Current Assets	......	......		
Notes Receivable	......	......		
Accounts Receivable - Customers	......	......		
1-30 Days	......	......		
31-60 Days	......	......		
61-90 Days	......	......		
90 Days and Over	......	......		
Accounts Receivable - Other	......	......		
Prepayments	......	......		
Less Provision for Bad Debts	......	......		
Total Current Assets	$......	$......		
OTHER ASSETS				
Lease-hold Improvements	$......	$......		
Total Unadjusted Debits	$......	$......		
TOTAL ASSETS	$......	$......		

FIGURE 5 (Continued)

COMPARATIVE BALANCE SHEET

As at ____________

LIABILITIES AND OTHER CREDITS

	Current Year	Previous Year	Increase or (Decrease) Dollars	Percent
OWNER'S CAPITAL				
Initial Investment	$......	$......		
Unappropriated Retained Earnings	......	......		
CURRENT AND ACCRUED LIABILITIES				
Salaries and Wages	......	......		
Loans Payable	......	......		
Customer Deposits	......	......		
Data Processing Charges	......	......		
Federal Taxes Payable	......	......		
State Taxes Payable	......	......		
Local Taxes Payable	......	......		
Accounts Payable	......	......		
1-30 Days	......	......		
31-60 Days	......	......		
61-90 Days	......	......		
90 Days and Over	......	......		
Notes Payable	......	......		
Total Current and Accrued Liabilities	$......	$......		
OTHER LIABILITIES				
Donations	$......	$......		
Grants	......	......		
Total Other Liabilities	$......	$......		
TOTAL LIABILITIES	$......	$......		

somewhat isolated to other commercial. In cities where large numbers of commercial customers are picked up on residential routes, then a classification such as "all containerized" and "all non-containerized" would be appropriate.

Further breakdown of the expense accounts appears in the third table, "DISTRIBUTION OF OPERATING EXPENSES." This will permit a detailed isolation of labor, equipment, operating, and maintenance expenses, and will be useful in the justification of rate increases should some form of regulation occur. The fourth table, "COMPARATIVE BALANCE SHEET," permits an assessment of the company's liquidity and general solvency.

b. Issues Involved in the Determination of the Rate of Return

In any regulated industry, it is difficult to determine what constitutes a fair rate of return because of the many variables involved and the variety of viewpoints regarding fairness. A long list of legislative precedents define Supreme Court interpretations of what constitutes a fair rate of return. One particularly complete description was stated in the decision in the Consolidated Gas case of 1909, which is:

> There is no particular rate of compensation which must in all cases and in all parts of the country be regarded as sufficient for capital invested in business enterprise. Such compensation must depend greatly upon circumstances and locality; among other things, the amount of risk in the business is a most important factor, as well as the locality where the business is conducted and the rate expected and usually realized there upon investments of a somewhat similar nature with regard to the risk attending them. There may be other matters which in some cases might also be properly taken into account in determining the rate which an investor might properly expect or hope to receive and which he would be entitled to without legislative interference. The less risk, the less right to any unusual returns upon the investments. One who invests his money in a business of a somewhat hazardous character is very properly held to have the right to a larger return without legislative interference, than can be obtained from an investment in Government bonds or other perfectly safe security....[1]

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[1] Willcox v. Consolidated Gas Co., 212 U.S. 19, 48-49 (1909).

Two factors are highlighted in this decision: Return on invested capital and return on risk. In industries which have had a long history of commission regulation, operating data exist to permit statistical determination of rates of return, and these are used in adjusting for "fairness" from time to time.

Another consideration in determining rate of return is efficiency, i.e., more efficient utilities should be offered a reward for efficiency in terms of a higher rate of return. In a Supreme Court case, Justice Brandeis argued as follows:

> Inefficient operations sometimes penalize the guilty utility and this matter of efficiency compared with inefficiency in the operations of a public utility has given rise to considerable controversy in regulatory circles as to the impact efficiency, or the lack of it, should have in fixing the allowable return. It does not appear to be reasonable to penalize a public utility's customers or subscribers for the inefficiencies of the utility. It would seem to be more reasonable that a utility should be allowed something more in the rate of return if it has demonstrated its ability to operate efficiently. While it is difficult to accurately evaluate this factor because of its imponderable nature, it would appear reasonable to conclude that a public utility is operating efficiently if it has a minimum of service complaints, is constantly improving its service, but is still able to produce higher earnings on lower rates than comparable or similar utilities in the same general area.[1]

Competition is supposed to compel management efficiency as firms seek ways of reducing costs in order to maximize profits and increase sales. Under regulation, however, if rates are fixed so as to enable all companies--those well managed and those that are not--to cover their costs plus receive a fair rate of return, there may be no stimulus for efficiency. Therefore, in determining a fair rate of return in an industry newly being considered for regulation, some incentive for efficiency must be included in rate regulation procedure.

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[1] General Telephone Co. of Florida, 44 PUR 3d 247,255 (Fla. 1962).

Another consideration in determining a fair rate of return is the "opportunity cost" of being in business. A solid waste firm's opportunity cost would be the revenues its owners could obtain by investing their capital elsewhere and working elsewhere. Although there are many advantages of being self employed, unless solid waste firms earn an "acceptable" rate of return they will, if economically rational, either leave the industry or refuse to invest in new needed equipment. They will "eat up" their fixed capital and then, if possible, leave the industry.

Interest rates are another consideration in judging a fair rate of return. If interest rates are low and all firms are earning a low profit rate, then the fair rate is low. The reverse is true when interest rates are high and firms are earning a low profit margin. Regulated industries, like unregulated industries, compete for necessary funds in the "money market." Regulated industries must be competitive in their earnings if they are to maintain their facilities and credit ratings. As profit levels and the rate of interest have grown over the last decade, it appears that the "fair rate of return" has increased. A fair rate of return can only be defined in terms of relevant economic conditions in the area under consideration. After defining the "fair rate of return," regulatory bodies will be faced with the problems of regulating the charges of each company.

c. Operating Ratios

There are two basic methods of computing rate of return for regulatory purposes: Rate of return on capital investment or "rate base," and rate of return on operating expenses, or "operating ratio." The first of these is normally used in capital intensive industries, and the latter in labor intensive industries. Examples of capital intensive industries are shown in the table on the following page, with the labor and capital expense shown as a percentage of total operating expenses.

Industry	Industry Average	
	Labor Expense as a % of Total Operating Expense	Capital Expense as a % of Total Operating Expense
Hydroelectric Power	12%[1]	88%
Steam Generation	15%[1]	85%
Bell System Telephone	12%[2]	88%

In comparison, for the solid waste management industry collection, labor ranges from 55 percent to 87 percent of total collection costs, which is significantly higher than in hydroelectric power, steam generation, or telephone service. The specific operating figures for solid waste are shown in Table 6 later in this section.

For these reasons, the "rate base" concept used in gas and electric utilities does not make sense for this industry. An alternative method of rate determination is the "operating ratio" method. The operating ratio is defined below.

$$\text{Operating Ratio} = \frac{\text{Operating Expenses}}{\text{Operating Revenues}}$$

As can be seen from this ratio, it is the complement of gross operating profit (e.g., an operating ratio of 93% indicates a profit of 7%). The justification for the use of the operating ratio for this type of industry can best be presented by the following quotation:

> "The use of the operating ratio arises from the characteristics of the motor carrier industry. The amount of investment is relatively small in relation to total costs. As explained by the commission:

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[1] Phillips, Charles F., Jr., "The Economics of Regulation"; publisher, Richard D. Irwin, Inc., 1969, p. 541

[2] Ibid, p. 654.

> "In industries where the amount of investment is large in relation to total costs, the rate of return on investment generally has been accepted as appropriate for determining revenue needs. In such industries the risk is related more to the amount of the investment and less to costs. On the other hand, where the amount of the investment is relatively small in relation to total costs, investment is not the primary factor in determining revenue needs.... The owners of motor carriers can hardly be expected to look to the return on the amount of their investment as an incentive where the principal risk is attached to the substantially greater amount of expense.
>
> The essential point is that when investment is so small in relation to total costs, "the margin of revenues over expenses required to pay a normal rate of return on capital invested would be so small that a slight miscalculation of probable revenues or expenses could leave the carrier with revenues insufficient to pay operating expenses."[1]

The uniform system of accounts, developed by Applied Management Sciences in this study, permits the uniform calculation of the operating ratio, so that a regulatory agency could analyze ratios prepared on a comparable basis.

In order to obtain some insight into the operating ratios of this industry, operating data on fifteen municipal and three private solid waste operations were examined. Because of the lack of a uniform system of accounts, the accounting data needed to be reorganized to provide comparability. Raw operating data are shown in Figure 6, while ratios computed from these data are shown in Figure 7. Obviously, based on these few operations, no attempt was made to achieve statistical significance. Other ratios beside the operating ratio are useful as indicators of efficiency, which is discussed below. The geographical locations of the municipal operations (not the private) are shown in Figure 8.

Six of the cities--Fort Worth, El Paso, Des Moines, Tacoma, Anchorage, and Sarasota--have user charges. Two municipal systems, Sarasota and Tacoma, service commercial as well as residential

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[1] Phillips, Charles F., Jr., "The Economics of Regulation"; publisher, Richard D. Irwin, Inc., 1969.

FIGURE 6: COMPARISON OF OPERATING COSTS AMONG CITIES

COST AND PERFORMANCE ELEMENTS	1970 Houston Texas	1970-71 Baltimore Maryland	1969 Cincinnati Ohio	1971 Minneapolis Minnesota	1970-71 Fort Worth Texas	1970 Toledo Ohio	1970-71 El Paso Texas	1972 (Budget) Dayton Ohio	1971 Des Moines Iowa	1971-72 Grand Rapids Michigan	1970 Tacoma Washington	1971-72 Scottsdale Arizona	1971 Anchorage Alaska	1970 Sarasota Florida	1971-72 Lancaster New York	Company A	Company B	Company C
Total Operating Exp.	$7,501,448	$7,317,091	$3,345,585	$2,278,093[D]	$3,607,952	$3,297,006	$2,319,118	$3,122,720	$1,725,402	$609,034	$1,472,465[G]	$596,367	$1,032,403	$759,508	$146,327	$ 8,750,000	$3,490,000	$ 7,700,000
Revenues					$3,514,893		$2,341,290		$1,973,088		$1,531,883[H]		$1,072,676	$700,000		$10,390,000	$4,300,000	$ 8,280,000
Collection Expense	$5,653,987	$5,430,300	$2,142,739	$1,619,435	$3,209,537	$3,221,956	$2,150,456	$2,360,320	$1,312,713	$338,984	$1,252,054[I]	$506,367	$ 959,175	$643,684	$122,327			
Coll. Salary & Wages	$4,957,883	$3,953,306	$1,697,750	$1,347,736	$2,620,910	$2,397,203	$1,708,000	$1,996,240	$ 776,701	$240,593	$ 800,938	$235,041	$ 527,136	$378,736	$101,697[K]		$ 740,000	$4,630,000
Disposal Expenses	$1,867,731	$1,886,791	$1,202,846	$ 658,648	$ 398,417	$ 75,050	$ 167,662	$ 671,500	$ 412,689	$270,070	$ 220,411	$ 90,000	$ 64,106	$125,824	$ 24,000			
Disposal Sal. & Wages		$1,194,749	$ 889,150		$ 208,604	$ 40,104	$ 133,815		$ 176,116	$127,050	$ 74,345	$ 36,000	$ 41,334					
Collection Eqp. Exp.	$ 651,574	$ 908,152		$ 165,909	$ 585,627	$ 585,707	$ 418,461	$ 325,580	$ 238,378	$ 99,217	$ 105,571	$184,947					$1,450,000	$1,290,000
City Population-1970	1,213,064	895,272	448,492	431,977	393,123	379,104	317,462	239,591	201,904	195,492	151,061	66,852	46,137	38,740	13,373			
# of Resid. Units	236,250[A]	300,000[A]	145,848	46,000[A]	104,748	131,904	70,000	70,457[E]	60,000	57,615[E]	47,150	20,000[A]	13,570[E]	12,628				
# of Comm. Units Svd.	33,750[A]										10,120	5,000[A]						
# of Resid. Stops	708,750	600,000	143,848	46,000	104,748	131,904			60,000		47,150	20,000[A]		27,256	26,746			
# of Comm. Stops					3,869						10,120	5,000[A]						
# Tons Res. collected	382,400[B]	402,299	195,051[A]	47,792	180,458[A]	140,379	143,650[A]	85,000	56,250[A]		52,742	46,800		30,352				
# Tons Comm. collect.	95,600										12,508	23,400						
# of Collection Empl.			287	102		200	342		72	29	80	26		30				
# Disposal Employees									17	12	7							
# of Tons Disposed		555,519			306,801	150,000	169,000		295,000[F]		195,450	87,750[J]		33,252				
Crew Size-Collection	3	3.5[C]		3	3	4			3		3	3		2	3			
Monthly User Charges Basic Res. Service (1/wk.-2 cans)	none	none	none	none		none		none	$2.00	none	$2.60	none	$3.65		none			
(twice/week)					$2.50 $5.00 carry out		$2.50/mo. twice wk.						$5.40	$2.95 + subsidy				

LEGEND

A. Estimated
B. Estimated - 80% of all tonnage
C. 3 men 3 days/wk. and 4 men 3 days/wk.
D. Extrapolated - excludes MRI
E. Converted from population figures at 3.4 persons/residence
F. Converted from cubic yds. at 500 lbs. per cubic yd.
G. Less Crusher Project Expense
H. Includes both commercial and industrial revenues
I. Excludes fringes (such as Insurance, FICA, Workman's Comp., etc.) but includes Vacation, Sick Leave, etc.
J. Excludes 2 Godzillas/1 man each
K. Includes fringe benefits

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FIGURE 9: COMPARISON OF FINANCIAL RATIOS AMONG CITIES

	1970	1970-71	1969	1971	1970-71	1970	1970-71	1972	1971	1971-72	1970	1971-72	1971	1970	1971-72			
	Houston Texas	Baltimore Maryland	Cinn. Ohio	Mpls. B Minn.	Ft. Worth D Texas	Toledo Ohio	El Paso Texas	Dayton Ohio	Des Moines Iowa	Grand Rapids Mich.	Tacoma A Wash.	Scottsdale Ariz.	Anchorage Alaska	Sarasota Florida	Lancaster New York	Company A	Company B	Company C
Operating Ratio (Total Exp÷Total Revenue)					1.03		.99		.87		.96		.96	1.10		.84	.82	.93
Collection Expense as % of Total Expense	.75	.74	.64	.72	.89	.97	.93	.76	.76	.56	.55	.85	.93	.84	.84			
Collection Labor as % of Total Collection	.87	.73	.79	.83	.82	.74	.79	.84	.59	.71	.64	.56 F	.55	.59	.83	-	.22 G	.60
Collection Equipment as % of Total Collection	.13	.17			.13	.18	.21	.14	.18	.26	.08	.21	.19		.17	-	.41	.17
Disposal Expense as a % of Total	.25	.26	.36	.28	.11	.03	.07	.24	.24	.44	.15	.15	.07	.16	.16			
Disposal Labor as % of Total Disposal		.63			.52	.53	.80		.43	.47	.34	.49	.64					
Total Cost Per Ton (Collection & Disposal)	$18.70	$15.16	$17.16	$38.78	$18.38	$23.45	$15.96	$35.67	$24.76		$24.35	$ 8.24		$25.35	$14.63			
Collection Cost/Ton	$14.79	$11.76	$10.99	$33.88	$16.73	$22.95	$14.97	$27.77	$23.34		$23.72	$ 7.21		$20.91	$12.23			
Disposal Cost/Ton	$ 3.91	$ 3.40	$ 6.17	$ 4.90	$ 1.65	$ .50	$ .99	$ 7.90	$ 1.40		$ 1.13	$ 1.03		$ 4.15	$ 2.40			
Annual Cost/Residential Stops	$31.75	$36.59	$23.26	$35.20	$34.40	$25.00	$33.12	$44.31	$23.12		$31.22	$23.32	$76.08	$56.46	$43.68			
Annual Cost/Residential Visit	$10.58	$18.30	$23.26	$35.20	$17.22	$25.00	$16.56	$44.31	$23.12		$31.22	$11.66	$76.08	$29.23	$21.83			
Stops/Direct Man/Week Residential	1,579		461	460	989	131	689		833		749	2,000		1,098	425			
Total Stops/Truck/Week Residential (Includes Specials)				1,353	2,967 D				1,395		1,886	5,000		1,816	2,125			
Route Stops/Truck/Week (Excludes Specials)	4,725		1,821	1,438	2,967 D	2,368	2,413		2,500		2,245	5,000		2,096	2,125			
Tons/ Truck/Week (Total)			65.4	27.0 C (34 truck)		54	47.6		45.1 E		50.2	96.4		39.3	96			
Tons/Truck/Week Residential	49.0	82.3	45.3	28.7	50.3	54	47.6		45.1		40.6	113		44.9	96			
Tons/Truck/Week Commercial											120.3	75						
Total Collection Costs/Person	$ 4.66	$ 6.07	$ 4.38	$ 7.27	$ 8.27	$ 8.50	$ 6.77	$ 9.85	$ 6.62	1.73	$ 8.29	$ 7.57	$20.79	$16.62	$ 9.15			

LEGEND

A. Primarily Alley Pickup and Row Houses
B. Primarily Alley Pickup
C. Low Tonnage Specials
D. Plastic Bag - Curb Service
E. Based on 24 route trucks
F. Two Godzillas
G. All Commercial Accounts

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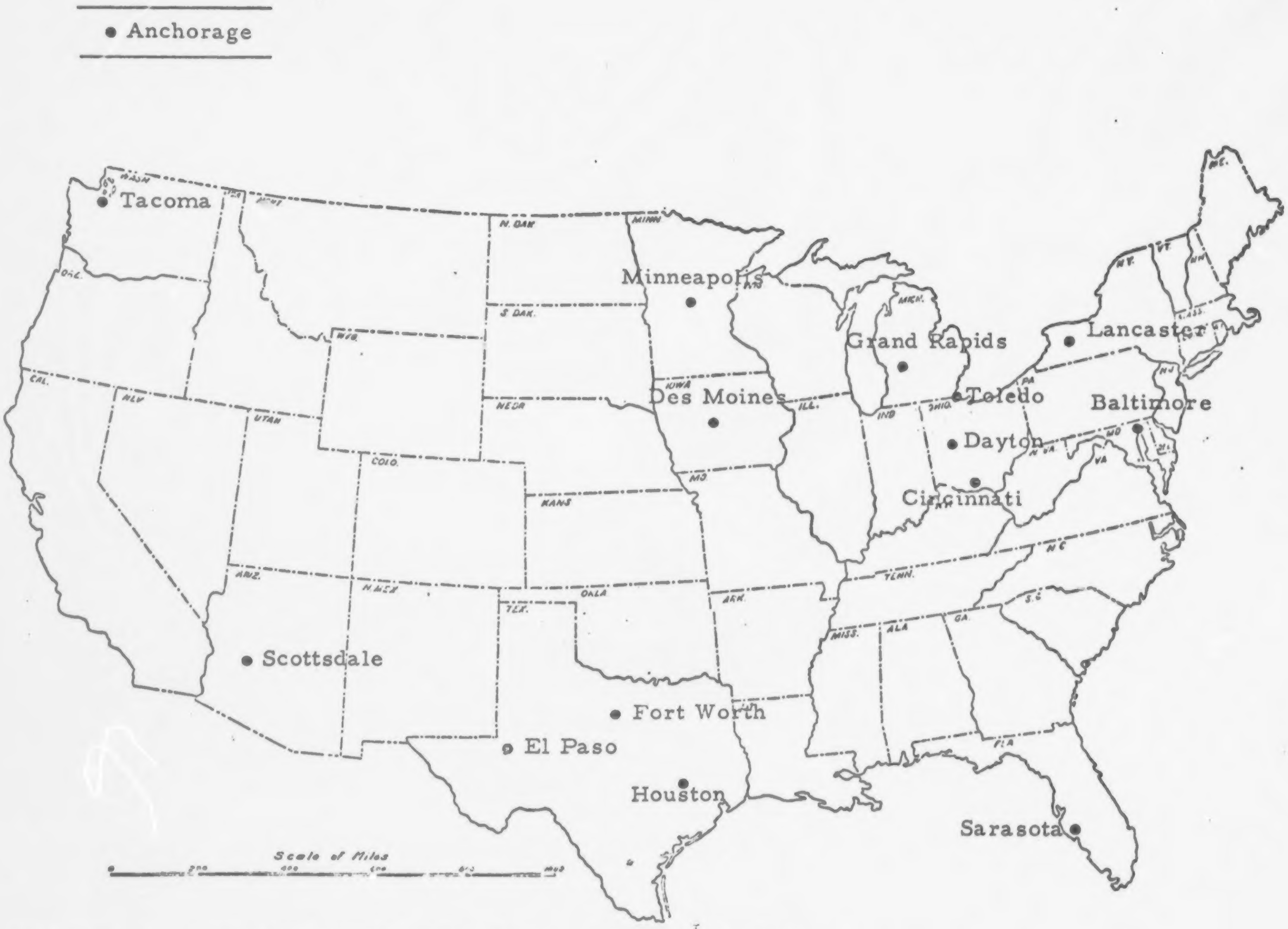
Anchorage
Tacoma
Minneapolis
Grand Rapids
Lancaster
Des Moines
Toledo
Baltimore
Dayton
Cincinnati
Scottsdale
Fort Worth
El Paso
Houston
Sarasota
Scale of Miles

FIGURE 8: CITIES IN WHICH COST DATA WERE COLLECTED

customers. Both have front-loaders which handle containerized refuse, and these front-loaders were excluded from the analysis for comparability with the other cities which handle only residential. "Light commercial," which includes waste stored in 20- to 30-gallon cans, is included for these two cities. Private firms A and C serve both commercial and residential, while firm B serves only commercial.

Two of these cities, Tacoma and Minneapolis, have predominantly alley pickups. These same two cities derive part of their revenues from their disposal operations. One city, Fort Worth, has curbside plastic bag service. In addition, Minneapolis has a franchise arrangement with a private corporation, MRI, which is an aggregation of 52 firms. A complete description of MRI appears in a separate report.[1]

Figure 7, the ratio comparison, illustrates first that cities with user charges have operating ratios[2] from 87 percent to 110 percent, which indicates that a profit range from 13 percent to a loss of 10 percent exists for this set of systems. Among the private firms, operating ratios ranged from 82 percent to 93 percent, or profits of 18 percent to 7 percent on sales.

As previously mentioned, collection labor is a very large percentage of total collection. It ranged from 55 percent in Anchorage to 87 percent in Houston. The relative labor intensiveness is normally a function of labor rates and number of people used. Therefore, this can be explained in some of the cities. For example, it is relatively low (56%) in Scottsdale because of the two "Godzillas." which reduce manpower and increase productivity. It is relatively high (83%) in Minneapolis because of the high labor rates in Minneapolis. Conversely, collection equipment is relatively small as a percentage of total collection expenses ranging from 8 percent in Tacoma to 24 percent in Grand Rapids. Again, some explanations exist for the relative capital intensity such as the age of the fleet and, therefore, larger proportion of fully depreciated equipment over ten years. In Scottsdale, it is high (21%) because of the high investment cost of the "Godzillas." Among the private firms, in one case, labor was not able to be extracted; in another, it was 60 percent of total collection costs; and in the third, it was 22 percent, primarily because they were heavily in commercial business. In commercial business, the labor percentage is low because one-man-per-truck reduces the labor component, and investment in containers increases the capital component.

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[1] Case Study Analysis of Solid Waste Manpower and Efficiencies, Applied Management Sciences, Study in progress at this writing.

[2] The Complement of profits, e.g., operating ratio = $\frac{\text{operating expenses}}{\text{operating revenues}}$

In summary, for this study these ratios provide a range of operating ratios which would serve as a guideline for beginning an analysis of fair rate of return on revenues if solid waste management was organized as a public utility. Clearly, a statistically valid sample should be drawn for such purposes. This analysis did illustrate the labor intensiveness of the industry which confirms the original assumption that rate regulation would have to be based upon rate of return on revenue rather than on a rate base of capital investment.

d. Rate Regulation

As a regulated public utility, solid waste firms will be greatly affected by the rate structure chosen by the regulatory authority. Bonbright, in his study on public utility rates, lists eight criteria of a sound or desirable rate structure. They are as follows:

- The related, "practical" attributes of simplicity, understandability, public acceptability, and feasibility of application.
- Freedom from controversies as to proper interpretation.
- Effectiveness in yielding total revenue requirements under the fair-return standard.
- Revenue stability from year to year.
- Stability of the rates themselves, with a minimum of unexpected changes seriously adverse to existing customers. (Compare "The best tax is an old tax.")

- Fairness of the specific rates in the apportionment of total costs of service among the different consumers.
- Avoidance of "undue discrimination" in rate relationship.
- Efficiency of the rate classes and rate blocks in discouraging wasteful use of service while promoting all justified types and amounts of use:
  - .. in the control of the total amounts of service supplied by the company;
  - .. in the control of the relative uses of alternative types of service (on-peak versus off-peak electricity; Pullman travel versus coach travel; single-party telephone service versus service from a multi-party line, etc.). 1/

Admittedly, these criteria are broad and ambiguous (what, for example, is "undue" discrimination?). They also overlap without offering any rules of priority in case of conflicts. How is the "cost of service" to be measured--marginal cost, average cost, or fully distributed cost? Clearly, the measure largely depends on the purpose that a rate is to fulfill. But the criteria are of value "in reminding the rate maker of considerations that might otherwise escape his attention, and also useful in suggesting one important reason why problems of practical rate design do not readily yield to "scientific" principles of optimum pricing." 2/

Bonbright further suggests that the three primary criteria are numbers 3, 6, and 8, namely,

> ...(a) the revenue-requirement or financial-need objective, which takes the form of a fair-return standard with respect to private utility companies; (b) the fair-cost-apportionment objective, which invokes the principle that the burden of meeting total revenue requirements must be distributed fairly among the beneficiaries of the service; and (c) the optimum-use or consumer-rationing objective, under which the rates are designed to discourage the wasteful

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1/ Bonbright, James C., Principles of Public Utility Rates (New York: Columbia University Press, 1961), p. 291. Also see Russell E. Caywood, "Electric Utility Rate Making Today," 81 Public Utilities Fortnightly 51, 53-54 (June 6, 1968).

2/ Ibid, p. 291.

> use of public utility services while promoting all use that is economically justified in view of the relationships between costs incurred and benefits received.

The solid waste industry, if it is to be regulated as public utility will face the problem of all regulated industries in determining a rate structure. For the solid waste industry, numbers 3, 4, and 5 seem to be appropriate to the primary objectives of the industry.

In order to avoid the administrative and bureaucratic delays which case-by-case rate tariffs would develop, the work of the commission could be simplified by defining "classes " of service. Once the tariff for a class of service was developed, any company providing service would know what it could legally charge. Fortunately, the services provided by the solid waste industry lend themselves to a logical classification. A proposed classification might be as follows: (1) Residential; (2) Light Commercial; (3) Heavy Commercial; (4) Industrial; and (5) Toxic or Hazardous Wastes. Many cities and private contractors combine these five into two, namely, residential and commercial, which covers all others. The regulatory agency would define precisely the base level of service for each class and the rates for each class. Sub-classes could then be defined if necessary as described in the previous section.

Price inequity is partially unavoidable. The cost of providing a particular service is difficult, if not impossible, to determine accurately. Some variable costs, such as labor and fuel, are easily identified with a unit of output, such as tonnage or stops collected. Other costs, however, such as overhead, are commonly or jointly incurred in rendering different types of service. Rather than varying directly with output, they decline in importance as output increases. These costs include interest, depreciation, investment in plant and equipment, and administrative overhead. When the same plant equipment, service, or overhead are used to provide several types of service, there is no one correct way to allocate these costs among different units of service. It will be up to the discretion of the regulatory agency to judge the accuracy of the cost allocation used in developing rates.

As a practical matter, the regulatory body should have the accounting staff conduct an audit of the books of regulated companies so that the accuracy of the information can be verified and the ground rules used in allocating costs can be clearly understood. The existence of a uniform system of accounts will be invaluable in comparing operating costs, in particular, and in rate regulation, in general.

The methodology of rate regulation could proceed along several paths. If done by a PUC, each "utility" could be required to file tariffs indicating their rate schedules, and these tariffs would be reviewed by the PUC. In the event of rate complaints by either the "utility" or a customer concerning rate inequity, a rate hearing would be held including full financial disclosure and audit. The proposed new rates could then be compared with rates for similar service within the industry, and operating ratios compared with industry norms (which would have to be developed). The commission would then pass judgment on the rates that could be charged--either accept the proposed rate, modify the proposed rate, or reject the proposed rate entirely and return to the previous rate.

Rate prescription by class of service is another methodological approach to rate regulation. In this case the PUC would prescribe a single rate for each class of service which would be applicable to all firms providing that kind of service. Firms which believed the prescribed rate provided too low a rate of return would have the right to appeal, and be subjected to a full audit and cost analysis. If their case was true and other firms showed similar cost experience, the PUC would be forced to reconsider the rates it prescribed.

Another approach which might be used by county or municipal regulators might be to solicit bids for a series of exclusive, franchised areas. As part of the bid, a complete specification of the service and complete financial disclosure would be required. A good model contract, a good uniform system of accounts, and audit authority would be a part of this process. This would not be regulation in the classical sense, but rather would provide for periodic review of rates and quality of service each time the franchise agreement expired.

3. Methods of Finance

Several different methods of finance are available to private firms and quasi-public organizations: private debt and equity financing, lease purchase, pay-as-you-go, revenue bonds. General obligation bonds were not presented since they are limited to purely municipal operations, and the solid waste component of these bonds may or may not be significant and identifiable.

a. Private Debt and Equity Financing

This method is the most frequently used currently by small private firms, large firms with franchises, and occasionally by municipal government. Because of the nature of collection equipment, which is trucks and containers, commercial loans for three to five years' duration are common financial instruments. Often large firms with established reputations in the banking community have a line-of-credit which permits revolving loans up to a specified level.

Among private firms involved in franchises, another element of collateral exists, namely the franchise and the guaranteed level of income it provides. In one franchising example, Minneapolis, many of the subcontractors to MRI found that this certain income level and affiliation with a multi-million-dollar franchise provided them with the borrowing power they needed. To date, only one of the 52 firms in MRI has utilized the assignment of his contract as a financial mechanism, although this is a common financing tool in other industries. This provides for payment from the contractor to the equipment supplier in the event of default, but the liability of MRI is limited to the extent of monies owed to the subcontractor, but not for the full price of the equipment. This means that most of them have additional borrowing power which has not been used to date.

In another franchising situation, Oregon, the stability provided by the franchise has also offered additional borrowing power. Again, in only one case out of approximately fifty has the franchise been assigned as collateral for an equipment loan, although the franchise agreement specifically calls out this right as a provision of the franchise agreement. The conclusion here is that the existence of a franchise definitely provides additional borrowing power, and the longer the franchise has been in existence with satisfactory performance, the sounder is this collateral.

It should be noted that a disadvantage of private debt financing is that, normally, higher interest rates are paid for this type of financing than for revenue or general obligation bonds. This is true even with the fluctuations in the money markets.

b. Lease-Purchase Agreements

This method of financing solid waste management equipment is growing in popularity. It is attractive to the private operator because with it he has less concern about financing and has a rapid write-off of equipment since a lease is an expense item. It is attractive to equipment manufacturers because it provides an additional selling point for them. Many of the manufacturers are now offering this method of financing, and at least one, Peabody-Galion, has set up a separate leasing company for this purpose. Commercial leasing companies not in the solid waste field are also beginning to get interested in this market. This method is not limited to private contractors. Many cities, such as Des Moines, Iowa, and Sarasota, Florida, are now using this mechanism. They have found that this method is ideally suited for capital equipment like trucks which can be written off in five years or less. Moreover, equipment costs can then be treated as operating expenses, thereby eliminating severe cash demands each time the fleet must be replaced.

c. Revenue Bonds

Municipal revenue bonds may be issued by a state, territory, or possession or by any of their political subdivisions. For example, municipalities, counties, and public agencies and instrumentalities such as commissions and authorities as well as private firms can issue revenue bonds. The bonds are payable from revenues derived from charges against the use of facilities owned by the issuer of the bonds. In the past, revenue bonds have been issued to finance construction of canals, turnpikes, water and wastewater treatment plants, and electric systems. Today, revenue bonds are issued to finance such varied projects as bridges, tunnels, turnpikes and expressways, airports, parking facilities, rapid transit systems, dock and harbor facilities, arenas, auditoriums, parks, hospitals, schools, dormitories, student union halls, and stadiums.

Two principal reasons for cities issuing revenue rather than general obligation bonds have been that (1) revenue bonds are based on the concept that only the users of the facilities financed by the sale of the bonds pay for the facilities, and (2) revenue bonds are not ordinarily subject to statutory or constitutional debt limits.

When revenue bonds are issued, the issuers agree to meet certain requirements. Rates must be maintained at a level sufficient to meet operation and maintenance charges and annual debt service requirements and also to provide certain reserves. Revenue bond issuers are normally required to maintain an insurance level comparable with a private enterprise providing the same function. In most cases, the issuer agrees to maintain the properties in good repair and working order at all times. Many issuers agree that no preferential treatment shall be accorded any group or groups in the matter of payments of rates for services. The practice of requiring the issuing agency to maintain a consulting engineer of national reputation to provide a "watchdog" service over the operation of the facility is becoming a common practice. Most issuing bodies agree that they will keep proper books of records and accounts and that there will be an audit at least annually of the properties by a certified public accountant.

In a practical sense, revenue bonds cannot be used for trucks since the life span of most bonds (ranging from 15 to 30 years) exceeds the life span of the equipment by several times. Another practical constraint on the use of revenue bonds in this industry is the requirement for a large enough issue to be attractive in the money market (e.g., greater than $1,000,000). Once trucks are excluded, many cities cannot put together a million-dollar capital requirement for solid waste. As mentioned earlier, the City of Des Moines is in the process of issuing a revenue bond for $2,000,000 to purchase the land for, and construct two new land disposal sites.

d. Pay-As-You-Go System

The opposite extreme of an all-bond policy for capital improvements is the pay-as-you-go policy--meeting the cost of current improvements from current revenues. In the smaller cities, however, it must usually be coupled with a plan of putting aside reserves for a specific project or for general public improvements. With modified pay-as-you-go systems, some predetermined portion of annual capital outlay is financed by current revenues with the remainder coming from bonds.

Summary

In summary, solid waste management is a labor-intensive industry as compared with the hydroelectric power, steam generation, and telephone industries. This fact dictates the use of operating ratios as a basis for rate regulation rather than the rate base commonly used in these other capital-intensive industries.

In analyzing the operating costs of refuse collection and disposal organizations, the first requirement is for a uniform system of accounts for this industry, which was developed as a part of this study. The second requirement is for revenue data which relates to the service performed. This can be obtained if the system has either fixed charges or user charges as defined in the preceding section. However, in systems which are financed in whole or in part with tax levies, rate regulation would be meaningless and impossible.

Based on a uniform system of accounts and revenue information, operating ratios can be developed for this industry. The very small sample of fifteen municipal operations and three private show a range of 87 percent to 110 percent for municipal, and 83 percent to 88 percent for private. If regulation is to be accomplished, a large statistical basis for operating ratios should be developed.

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The point about operating ratios leads into the determination of fair rate of return. While there are general historical guidelines concerning fair rate of return which are tied to risk, the only practical way to address this is to develop a statistical basis for the rate of return which is currently being earned in the industry, and over time adjust for factors such as inflation, changes in interest rates, changes in manpower availability, and labor rates, etc.

Finally, capital financing for this industry is available from private debt and equity sources. The existence of a franchise enhances borrowing power in the private money market. In addition, revenue bonds can be used for disposal site acquisition and development, but not for collection equipment. Two basic requirements of revenue bonds are a large enough offering to attract investors, and a maturity period which does not exceed the life of the equipment. Using working capital to finance equipment is not a good idea because it seriously affects cash flow.

4

FINDINGS AND CONCLUSIONS

It is clear from the study that a wide spectrum of versions of the utility concept are possible for solid waste management, and some are already in existence. Therefore, the broad question of whether the near-utility concept is feasible in solid waste management is a rhetorical question -- the concept is feasible in many forms. The real question is which form is most practical and most desirable from a variety of standpoints. The findings and conclusions of this study are presented below in summary form followed by answers to the questions posed in Chapter 2. Finally, the rationale for these answers is presented.

The judgment of the study group, in terms of the optimal forms of solid waste management organization and structure, constrained within the framework of a public utility or near-public-utility concept, is as follows:

- The solid waste collection function should be centralized at a the level of the minor political jurisdiction -- city level for city collection or county level for county collection.
- The solid waste collection system should be administered by the municipal government (or the county government for collection outside the city).
- The collection system should be owned and operated by private industry under a franchise agreement. *
- The disposal system may be owned and operated by either city or county government, or private organizations -- in any case, subject to the continued surveillance of the public health service and environmental agencies for environmental quality.

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*The Office of Solid Waste Management Programs does not endorse this general recommendation since both public and private collections systems can be equally efficient if managed properly. The decision to select a public system, private system, or a combination thereof is dependent upon local conditions.

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- Both residential and commercial accounts should be included in franchised collection service, recognizing that differences in equipment requirements may dictate different capabilities to perform this service.
- Regulation of the franchisee should be primarily by the local jurisdictional (city or county) level of government.
- Competition should be restricted to a limited number of companies within a franchise area. However, there should be several franchises awarded, which are renewed by competition every three to five years.
- Eminent domain should reside at the level of government which operates the landfill. Eminent domain is often impractical because of the unwillingness of local officials to invoke it.
- Rate regulation should be a part of the franchising mechanism and, therefore, be performed by the municipal government level. Requirement for submittal of accounting data based on a uniform system, and a full audit of these data, should be a part of the franchising process.
- Capital financing should be accomplished primarily by private debt and equity sources.
- The rate of return of the franchise holders should be determined based on operating revenues, and compared with norms for the industry. *
- The source of revenue should be from user charges according to service rendered. Rate classes and rates should be determined for commercial service based upon size of container and frequency of pickup. For residential, it should be based primarily on frequency and location (curb vs. backdoor) of pickup.

These are the findings of the study based upon examination of five in-depth case studies of near-utility or franchising situations, a canvass of 50 state laws, an analysis of financial data from 13 other cities, and a review of classical utility precepts.

Many of the questions asked in Chapter 2 are covered in the aforementioned conclusions, but it is useful to restate the questions in light of what was learned in the study.

- Is centralization of collection into one entity necessary or desirable? The answer is "yes", primarily for reasons of efficiency.

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*For this industry the rate of return is not generally known. In the future, however, this information may become available as more solid waste management companies are publicly owned and publish their rate of return for stockholders. Until such information is available (local) government must set rates or fees based on their acceptance of the contractor's audit.

- Is regionalization a practical part of the solid waste utility concept? If so for both collection and disposal? The answer is "no" for collection, and "yes" for disposal. Regional collection appears, at this time, to be politically unacceptable. In addition, the region does not appear to provide a strong enough administrative authority or relate to individual users to the same degree as the more local government organization. Distance is not as great a problem for disposal, however, and in light of the difficulty in locating a site, locating a single or a small number of regional sites for a large area has some merit.

- Should residential and commercial collection be included as part of the concept or only residential collection? Both residential and commercial collection should be a part of the concept for two reasons: First, in many cases, both types of customers are interspersed geographically and are a part of the route consolidation process; and second, because the higher profitability of commercial service tends to balance the lower profitability of the residential service.

- Should collection and disposal functions be combined or separated in the utility form? They should be separated, primarily because each represents an entirely different set of problems which can be better handled separately. In addition, maintenance of separate organizations inhibits dependency on a single, consolidated unit.

- Is limitation on competition desirable? The answer is "yes"; limitation in the form of the issuance of a franchise or franchises is desirable, primarily for reasons of efficiency.

- Is eminent domain specifically for solid waste necessary at the state level and as a vested power of the utility? Eminent domain is most effectively vested at the level performing disposal, but as a practical matter is not often invoked.

- What role should municipalities and counties play in the management of solid wastes? The most important recommendation of this study concerns the role of the local political jurisdiction -- the city and county. These units should administer and regulate a franchised collection system and participate in a regional or private disposal system.

- What is or should be the regulatory function of the public utility commission or public service commission and other state agencies such as the environmental agency? There is no need for state PUC or PSC involvement assuming a municipal-level franchising arrangement. The environmental agency will continue to have a health and environmental protection role.

- Should municipal revenues such as real estate tax levies be used to cover operating costs in this industry? The answer is "no", because there are other means available which are compatible with franchising, and which are more equitable to the consumer.
- Should rates be, in fact, user charges which reflect specific service rendered? If so, how should they reflect service rendered? Rates should be user charges which are keyed to frequency of pickup and container size for commercial and primarily frequency and location of pickup for residential.
- What types of depreciation periods are applicable to this industry, and do most contracts or franchises cover adequately this depreciation period? A three-to-five-year depreciation period appears to be common for refuse trucks. A wide variety of franchise periods exist from one to ten years.
- What are the requirements for a rate base and the rate of return? Is this return on investment or return on sales? The rate of return on sales is appropriate rather than rate of return on investment because this is a labor-intensive industry. The scope of rates of return varies from zero to 13 percent among municipal operations investigated, and from 12 to 18 percent among private firms.
- Are the population and/or other demographic characteristics of the urban area serviced important? With respect to the scope of this study, these characteristics do not appear to be important to the replication of a franchising system.
- Are urban, rural characteristics important to replicability? Urban, rural characteristics would affect the level at which franchising would be administered -- city if urban and county if rural.
- Does industrialization or the local labor market affect replicability? Industrialization does not appear to affect the replicability of franchising, but the labor market may affect it if, as in Minneapolis, there is union resistance to franchising.
- Are there special operational characteristics of the city, such as alley pickups, which affect replicability? No, collection systems obviously work under all conditions. There are, of course, some cost effects.
- Do political conditions exist, on a broad enough scale, to allow replication of various utility concepts? Political conditions do exist to allow various utility concepts. It should be noted that the political constraints are most important in the inhibition of regionalization.

3

The conclusions and findings and answers to questions were arrived at through a deductive process which began with feasibility, then examined practicality, then finally determined desirability. This process began by eliminating the extremes. For example, the completely open-competition situation, which now exists in many parts of the country, is one extreme which was eliminated based upon the excessive competition problems to which it often leads. At the other extreme is the monopoly situation which exists in many cities in the form of municipal collection service. In these instances, while route consoliation is present, there is no competitive incentive for efficiency. For this reason, that extreme was also eliminated.

This left franchising, or oligopoly, as the remaining structure. This judgment narrowed down the options since the conclusion that some form of municipal franchising is best, eliminates many alternatives. Franchising implies exclusive coverage of an area of a city or county. It is competitive in the sense that there are more than one franchisee in the total metropolitan area, and that every three to five years the franchise is opened up for competition.

Once the extremes were eliminated, a formidable task of reducing the options remained. It was determined that this could be accomplished best by arraying the issues and determining which were feasible, practical, and desirable.

Management and Organization

Figure 9 on the following page illustrates the management and organization issues and the study assessment of their feasibility, practicability, and desirability. The question of no centralization at all implies a completely free and open situation in which no single governmental or quasi-governmental body coordinates the activities of solid waste collection and disposal. In the judgment of the study team, this is neither practical nor desirable. The city level for centralization appears to be the level closest to the actual operation of collection and the level at which most people feel some influence in feeding back their desires or complaints.

ISSUES	FEASIBLE	PRACTICABLE	DESIRABLE
Centralization Level			
None	x		
City	x	x	x
County	x	x	x
Region	x		
State	x		
Administrative Level			
None			
City	x	x	x
County	x	x	x
Region			
State			
Collection Ownership and Operation			
Private	x	x	x
City	x	x	
County	x	x	
Region	x		
State			
Disposal Ownership and Operation			
Private	x	x	x
City	x	x	x
County	x	x	x
Region	x	x	
State			
Residential/Commercial Coverage			
Residential Only	x	x	
Commercial Only	x	x	
Residential and Commercial	x	x	x

FIGURE 9: MANAGEMENT AND ORGANIZATION

Moreover, it represents a level at which fees can be collected in a direct and convenient manner. For these reasons, the study has indicated the city (or minor political jurisdication) level as being feasible, practical, and desirable as a centralization level. The county is used as a centralization level in several parts of the country and, therefore, is feasible. In many respects, it is also practical, especially in the case of disposal which involves wastes which are collected in several adjacent governmental units and deposited in a county land disposal site. For these reasons, the study has indicated the county as being feasible, practical, and desirable for collection outside the city. The regional level is something that is extremely amorphous -- it differs widely from among parts of the country. Often there are councils of government that attempt to put together quasi-executive agencies among adjacent counties and cities, and in some cases states. But with a few exceptions, these agencies fail to have the power necessary to accomplish a difficult operational task. For this reason, the study has indicated the regional level as being feasible, but not practical or desirable. Finally, the state is being used as a centralization level in several instances in this field. However, it is so far removed from day-to-day operations that it does not appear to be a viable mechanism for providing continuously good service since the feedback from the people being serviced is a cumbersome procedure if they would have to go back to the state government. This single factor of remoteness from the day-to-day operations appears significantly strong for the study to conclude that, while the state is a feasible level of centralization, it is neither practical nor desirable.

The administrative level differs from the centralization level in that it is more concerned with providing the feedback from the citizens being served to the agency or company providing the service. It also deals with a more specific set of responsibilities, such as the feedback of opinion of the service and responsibility for the collection of monies and the payment of these monies to the agency or company providing the service. For this reason, the study has indicated the option of none is neither feasible, practicable, nor desirable. The city level, on the other hand, appears to be a natural level -- one which has accepted its responsibility to citizens in the past and has natural organizational mechanisms for dealing with it. Therefore, the study has indicated the city level is feasible, practical, and desirable. Similarly, the county level has some mechanism for dealing administratively with this problem. It is the judgment of this study that the county level is feasible, practicable, and desirable to administer collection outside the city. Both the regional and state levels appear to be neither feasible, practical, nor desirable because of their removal from the day-to-day operations. In order to properly administer solid waste management services, an agency of government or organization outside of government would have to be available to the citizens and have an organizational structure which lent itself to efficient administration of this service.

Among the options for ownership of the collection function, private contractors have owned and operated collection functions for many years across the country and, therefore, this option is feasible. When they perform the service under a franchised situation, they usually perform it efficiently and effectively based on the systems examined in this study. Therefore, the private sector under franchising is judged to be practical and desirable. However, in recent years cities have experienced an increasing difficulty in managing this function along with the other diverse duties of city government. On analysis of municipal systems across the country, the study has observed many instances of subsidization and less than breakdown operations. One of the reasons for this goes beyond simple management of the solid waste system, but rather into city government policies regarding the hiring of people and the creation of city jobs. Historically, this has been a convenient repository of people who might not be absolutely needed to perform the function. For this reason, the study has indicated the city government to be a feasible and practical owner and operator of collection systems, but not a desirable one. The same thing might be said for county government. It suffers from some of the same problems of the city, and, in addition, a history of little involvement by this level of government in the collection function. For this reason, the study has indicated the county level to be feasible and practicable, but not desirable. The regional level is feasible in concept but, in instances in which it has been tried, has not been successful. This stems from two factors: one is that regional authority and agencies do not always have the full support of the participants and, as conflicts arise between the participants, the regional authority usually loses the conflict. The second reason is that the region is removed from the day-to-day problem. A small town which is a satellite to a larger city, which is 30 or 40 miles removed from the city, feels uneasy about relying for its collection service upon a regional refuse collection system based in that city. It just is not that close to the people. This has been demonstrated so far in the instance of Des Moines, Iowa, in which the regional authority has obtained successful cooperation in disposal but not in collection.

Disposal ownership and operation is being conducted and can be conducted by four levels: private firms, city government, county government, and regional authority. It is also in the development stage at the state level in Maryland and New York, but at this writing no site has been put in operation in either of these states. Private firms have a history of developing disposal sites around most cities in the country. Until four or five years ago, one of the serious drawbacks of private sites was their unwillingness or inability to run a sanitary landfill. As a result of the efforts of the Environmental Protection Agency, and the private owners themselves, the poorly run sites which would not improve have been closed down, and the good sites have been upgraded. Consequently, we are reaching a point where privately owned and operated land disposal sites heed the environmental and health standards set by the EPA Public Health Service. This appears to be the only possible obstacle to private ownership and operation of landfill sites. Assuming this obstacle is overcome, the study finds that private ownership and operation is feasible, practicable, and desirable.

City ownership and operation of landfill sites also has a long history. The problem that arises in the city operation is that most cities, especially ...

those in the Eastern part of the country, are land poor and have just about run out of land for disposal within their incorporated boundaries. For this reason, they have to rely on counties or regional authorities or private owners in some outlying areas. This problem is currently being faced in a rather critical way by the cities of Washington, D.C., and Philadelphia, Pennsylvania, to name just two. For these reasons, the study indicates that, while the city is a feasible and practicable owner, it is not a desirable owner and operator of disposal sites in general.

The county appears to be the repository for most solid waste for a metropolitan area and will be for some time. County-run sites usually attempt to set their rates at a break-even or slightly profitable level, and can compete in many respects with privately owned and operated sites. For this reason, the study has found the county-run sites to be feasible, practical, and desirable. Regional sites have possibilities, as is being demonstrated in the region surrounding Des Moines, Iowa. They do, in fact, illustrate a mechanism for a single site serving multiple jurisdictional areas. For this reason, regional sites have been identified by the study as being feasible and practical. The study has stopped short of calling them desirable until there is more evidence that situations such as the Des Moines situation will work out. It is the judgment of the study that the state level makes no sense for the ownership and operation of disposal sites, even though state-level public health officials are involved in surveillance of these sites. This will be discussed in more depth later in this chapter.

The residential and commercial coverage by the collector or collectors who serve an area is a very important issue. Residential collection is defined in the study as single-family units and two-to-four family units, but not including five or more unit apartments. Currently, all sets of possibilities exist with respect to collection of residential and commercial waste. In some cities, private firms pick up both types. In other cities, municipal government picks up both kinds. And in a still larger set of cities, there is some mix with municipalities picking up the bulk of residential waste and private haulers picking up the bulk of the commercial waste. There are two major issues which lead to the conclusion that a hauler servicing an area ought to handle both commercial and residential waste. The first of these is an economic point. Commercial collection is, in general, more profitable because of the efficiencies that are possible in containerized service. For this reason, many cities which have chosen not to get involved in commercial collection have, inherently, a smaller chance of breaking even because they have strictly residential accounts. The second point is one of an agency or company's responsibilities for serving the public, and this includes both profitable and unprofitable accounts and easy-to-service as well as difficult-to-service accounts. This responsibility, in concert with the economic opportunity offered by commercial service, leads to the conclusion that a balanced mix of accounts offers the collector an opportunity to make a profit and also provides the mandatory service to the community that it needs. It is, therefore, the finding that combined residential and commercial collection is the feasible, practical, and desirable approach to this issue.

Legislative and Legal Issues

Figure 10 shows the legislative issues matrix. Regulation is currently performed in solid waste management at several levels throughout the country. As mentioned in the body of the analysis, it is performed at the city, county, regional, and state levels. Therefore, feasibility definitely exists at these levels and, in addition, practical regulation occurs at the city, county, and state level. It is not clear whether practical regulation can be conducted at the regional level although, for the disposal function, it is beginning to be demonstrated in the Des Moines, Iowa, situation. Also, most cities have a history of providing regulations of solid waste collection and disposal through either franchise agreements that are renewed periodically or rate regulations for specific types of service. Similarly, county-level franchising has been in operation in at least one state, Oregon, and to date appears to be working successfully. The possible exception is that franchises are extremely long and no audit requirement exists. Several other states are in the process of setting up

ISSUES	FEASIBLE	PRACTICABLE	DESIRABLE
Regulatory Level			
None			
City	x	x	x
County	x	x	x
Region	x		
State	x	x	
Competition			
Free and Open	x	x	
Franchise (Oligopoly)	x	x	x
Monopoly	x	x	
Eminent Domain			
None			
Public Utility	x	x	
City	x	x	
County	x	x	x
Region	x		
State	x	x	

FIGURE 10: LEGISLATIVE AND LEGAL

county-level regulatory boards for this industry. At the state level, State Public Utility Commissions or Public Service Commissions now have the legislative authority to regulate this industry in several states. However, in no instance to date has this regulation been implemented fully such that desirability can be fully tested, although one would have to conclude that state-level regulation is feasible and practicable. It is the conclusion of this study, in light of the franchising requirement, that the most desirable regulatory levels would be the city or county level and, in time, possibly the state level could also prove to be desirable.

Competition is perhaps one of the cornerstone issues of the entire study since the degree to which competition is permitted or not permitted has vast implications on the way in which this service is conducted. At one extreme, free and open competition, which now exists in many cities, is allowed to prevail and in many of those instances does not operate efficiently and not in the best interest of the citizens being served or of the contractors providing the service. As previously mentioned, at the extreme this represents excessive competition which has historically been guarded against by regulatory bodies. At the other extreme is the monopoly situation in which a single agency or company has complete responsibility for all types of collection, and in some cases both. In these cases, and they are represented in many municipalities throughout the country, efficiency ceases to be an important criterion of performance. The lack of competition or any regulatory control over quality of service rendered, as well as budgetary considerations, results in no emphasis on cost-cutting.

Primarily for these reasons and reasons of efficiency, which are significant and are realized from route consolidation, it is the judgment of this study that franchising or some form of oligopoly is the best and most desirable way to conduct the collection function. This implies a partitioning of the city and/or county into exclusive franchise areas which would be served by a single company. In order to avoid the pitfalls of the monopolistic situation, these franchises should have a duration only long enough to permit depreciation of capital equipment, which would mean between three and five years in length, certainly no more than five. The number of such franchises would depend upon the size of the city, and should be left up to the discretion of the city officials who would perform the administrative function. Probably not less than two franchises should be issued for any city, and the upper limit should be some workable number.

The question of eminent domain is one which has received a high level of attention prior to this study, but in the judgment of this study is less important than many other issues. In law, it is commonly understood that the state has the right of eminent domain and may delegate this right to lower levels of government and, therefore, by implication, the county and city have this authority. Regional agencies, when they are formed, may or may not be given this authority, depending on the laws under which they are formed. In the case of Des Moines, Iowa, the regional agency does have this authority. It is almost common practice in a utility situation to grant the utility this authority. Historically, this has been required for the laying of railroad tracks, new roads, and the location of power lines and sewer pipes. It is, therefore, both feasible and practicable for all of these organizations to have this authority, with the possible exception of the regional authority for which it may not be practicable. However, political constraints usually dictate a very limited use of this power. For a controversial subject, like the location of the landfill, all levels of government are extremely reluctant to use this authority, even though they have it. In the course of this study, the question has been asked in many states, counties, and cities "why did you not locate a landfill by condemning property". The answer has been, "the political furor caused by such action would have been "horrendous." Therefore, it appears that for some time to come the utilization of private mechanisms for purchasing land and the normal processes of rezoning such land will be heavily relied upon. It is the judgment of this study that the right of eminent domain for purposes of land disposal sites is more desirable to reside in the county, because this is normally the location of the landfill site.

Finance

Figure 11 shows the finance matrix. Rate regulation is currently conducted in a variety of ways throughout the country. In some areas, there is no rate regulation. In others, there is regulation by city, county, regional, and state level of government. It appears that "no regulation" is not a practical approach to developing an efficient system that provides quality service at the lowest rates. City-level regulation normally takes the form of city administrative officials contracting for services and conducting these through either negotiated contracts or open-bid situations. The city rarely assumes a regulatory role in competitive situations, but only in situations involving the award of a franchise or a contract for a specific area within the city. County-level regulation has taken the form of county solid waste boards reviewing the rates of contractors and issuing franchises in some cases for solid waste collection. At the state level, the legal mechanism exists for public utility commission regulation of rates. This is true in New Jersey and in several other states in a much less well-defined way.

The actual mechanism of rate regulation is one which involves the submission of accounting data based upon some uniform system of accounting, the filing of tariffs for specific rates, the review of both the accounting data and the tariff by the public utility commission staff, and a rate hearing permitting the contractor to make his case. Finally, the commission would pass judgment on the private contractor's rate application. This is a process which is conducted in other industries as part of the regulatory system. However, because of the large number of private contractors which exist in most states, it is a cumbersome process and one in which the public utility commission could get bogged down. In addition, local differences in cost, labor markets, prices of equipment, etc., are such that it would need to be conversant in all of these factors to pass an enlightened judgment on rate applications. Once again, the fact that the state-level government is removed from the day-to-day operations would prove to be a handicap. It is, therefore, the judgment of the study that city-level rate regulation would be in the best interest of the citizens receiving the service and the contractors providing the service.

ISSUES	FEASIBLE	PRACTICABLE	DESIRABLE
Rate Regulation			
None	x		
City	x	x	x
County	x	x	
Region	x		
State	x	x	
Capital Financing			
Private Debt	x	x	x
Private Equity	x	x	x
General Fund	x		
Operating Revenues	x		
Revenue Bonds	x	x*	
Rate of Return			
Open Market Determined	x	x	
Regulated Based on Capital Investment			
Regulated Based on Revenues	x	x	x
Source of Revenue			
General Fund	x		
User Charges by Class Only Commercial/Residential	x	x	
User Charges by Service Rendered Within Class	x	x	x
Fixed Charges	x		

* Disposal Only

FIGURE 11: FINANCE

Private debt, private equity, and operating revenues are the most practical alternatives of capital financing. Utilizing monies in the general fund in the municipal operation is one procedure which leads to lack of visibility of true operating costs. An even more compelling reason for not using the general fund for capital financing is that most city general funds simply cannot withstand this surge in expenditures every four or five years that is required to replace fleets of refuse collection equipment. Operating revenues, while a feasible source of capital financing, are usually not practicable because of the cash flow problem they cause. Most cities do not generate enough operating revenue to replace their fleets and still have a smooth cash flow, especially in light of what often turns out to be slow collection of revenues.

Revenue bonds represent still another avenue for capital financing. Such bonds make sense for the acquisition and development of disposal sites but not for collection equipment. The reason is that the tenure of a revenue bond normally may not exceed the life of the equipment which it is being used to finance. Therefore, a fifteen-to-twenty-year revenue bond could not be used to finance three-to-five-year life expectancy equipment. For this reason, revenue bonds are not a desirable alternative and only partially a practicable alternative. This leaves private debt and private equity as the two most desirable forms of capital financing for this industry.

The rate of return on operating revenues is currently determined in most cases by the open market. Private contractors charge what the market will bear in parts of the country which have no regulation. In comparing the nature of this industry's financial structure with that of other commonly regulated industries, it was found that this is an extremely labor-intensive industry, unlike capital-intensive industries such as hydroelectric power, steam generation, and telephone service. For this reason, the conventional "rate base" which is used to determine rate of return on invested capital does not make sense. Rather, "operating ratios" which determine rate of return on revenues appear to be applicable. This leaves the two issues of open market and regulation based on revenues as the only two practicable alternatives. Because of the possibility of either excess rates being charged or the other extreme--rates which are too low being charged--it is the judgment of the study that some form of rate regulation is necessary. Therefore, the conclusion of the study is that regulation based on revenues makes sense for this industry. The specific determination of what constitutes a fair rate of return is a very complex issue, and one which has to be developed for each industry in which regulation is imposed. There are general guidelines for determining rate of return, most of which are tied to investor risk. However, the only practical way to do this is to develop a statistical base of what operating ratios have been achieved and are being achieved among a very large sample of the industry, and use this as a current guideline for establishing an acceptable rate of return. In future years, then, as such factors as inflation, the labor market, and interest rate change, the level of fair rate of return can be adjusted.

The source of revenue issue deals with methods of generating day-to-day operating revenues or working capital. Historically, this has been accomplished in one of several ways: first, through tax levies, monies were generated and deposited in the city's general fund. Then, based upon the budget for the refuse collection service, monies were transferred to the refuse collection operating budget. A second method is that of assessing a user charge based upon the class of service. In solid waste management, the two broad rate classes would be "residential" and "commercial." A third approach would be to assess a user charge based upon service rendered. In this case, within the two broad classes of service, sub-classes would be developed such as container size, frequency of pickup, and number of containers. The fourth approach to generating revenue would be assessing a fixed charge to all customers served.

All four of these are used throughout the United States and, therefore, are feasible. However, only the two types of user charges appear to be practicable. The reason for this is that for public services there is some rationale for charging citizens according to service rendered. In the case of gas or electric, the technology permits careful metering of these commodities and, therefore, the homeowner pays precisely for what he has used. In the case of solid waste management, there are indicators or parameters of usage; however, at this point in time, metering is not possible. For this reason, the study is recommending as desirable, a user charge system based upon service rendered within class. Further, we suggest that frequency of pickup in the case of residential collection is the most important single parameter, with number of containers being somewhat less important. In the case of commercial service, size of container and frequency of pickup are both equally important as two key parameters upon which rates should be based.

This completes an issue-by-issue discussion of the findings and conclusions of the study. It would be naive to assume that a city could simply take the conclusions and overnight implement a brand new approach to solid waste management. During the course of the study, Applied Management Sciences has been very sensitive to the practical problems of transition when one system is phased out and a new one is phased in. For example, an apparently smooth transition was accomplished in the City of Minneapolis over a one-year period, in the formation of the holding company, Minneapolis Refuse, Incorporated, from 52 smaller companies. In this instance, the smaller companies were giving up some autonomy and independence, but were convinced that a unified corporate structure would provide them the opportunity for more efficient operation and better service to the community.

Other problems in transition would be a city's reluctance to give up the Sanitation Department's collection function, even though the department may have been performing at low service levels, or inefficiently and at high cost. There is the institutional problem of ingrained departments not wanting to be reduced in size. Further, union or civil service organizations might strongly resist the reduction in jobs resulting from a system change. However, this has been accomplished in the past through a phase-out period in which they allowed attrition to reduce the labor force as the new organization or franchisee took over the service. There is also an array of contracting problems which would have to be overcome in selecting franchisees, partitioning the city into franchised areas, and dealing equitably with each franchisee in terms of costs and his growth potential.

It is the opinion of Applied Management Sciences that a transition period of at least one year, and possibly two, would be required to accomplish all of these things which represent real, practical problems. Depending upon the state of solid waste collection and disposal at the time the transition was begun, they are soluble in time. Should the Environmental Protection Agency desire to pursue this concept, the next logical step, a demonstration project, could be undertaken in which they would underwrite the unusual expenses incurred during the transition period. For example, there would be organizational, legal, and public relations expenses in convincing both the community and existing private haulers that a change was desirable and needed, etc. Such a transition would require the highest caliber of technical assistance in the form of guiding these activities over the one- or two-year period of transition. It is the opinion of Applied Management Sciences that such a program would take great strides toward establishing a model solid waste management institution in a single city in the country that could be cited as an example for other cities to follow.

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